

NetworkWorld

NetworkWorld PC WORLD
SERVER TEST SERIES
DEBUTS

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

Page 39.

OS/2 displaces WinNT after bank takeover

By Peggy Watt
Atlanta

One of Microsoft Corp.'s earliest successes in its drive into the enterprise is falling prey to cold business realities: acquisition and assimilation.

Bank South Corp., headquartered here, was ahead of schedule in its overhaul of 150 branch offices throughout Georgia. In early 1995, out came the IBM 4700 Banking Systems and Personal System/2 desktops acting as text-only terminals.

In went 150 new AT&T Global Information Solutions Globalyst 3416XL servers running Microsoft's Windows NT Server Edition and nearly 2,000 AT&T workstations running Windows for Workgroups. Bank South sprang for new 3Com Corp. routers and hubs. Tellers were starting to use Windows and mice.

Then came the acquisition. Last September, NationsBank Corp. announced it was buying Bank South. The new property and its computer systems needed to come into the NationsBank fold, which meant reversing Bank South's downsizing campaign — dusting off those IBM 4700s — and moving to OS/2 LAN Server instead of Windows NT.

Bank South's dwindling information systems staff spent its remaining weeks in late January helping tear out its Windows NT installations to prepare for the new components of NationsBank's Model Banking, an initiative launched about a year ago in

nearly 2,000 banking centers throughout the South.

The IS staff is philosophical about the reversal.

"Such overhauls are a reality of mergers," said Al Schulman, the project manager who

See Bank, page 71

OUT WITH THE NEW, IN WITH THE OLD

OUT

Bank South technology:

- ▶ Windows NT
- ▶ AT&T GIS PCs
- ▶ GUI desktops

IN

NationsBank tools:

- ▶ OS/2 LAN Server
- ▶ IBM PS/2s
- ▶ Text-based terminals

MICROSOFT

IBM pushes Internet in server upgrade blitz

Will turn mainframes, minis and more into Web servers.

By Michael Cooney
and Ben Heskett

New York

IBM this week will roll out new and repackaged software it hopes will transform everything from its low-end RISC servers to its mainframes into industry-leading Internet hosts.

The product introductions advance IBM's network-centric computing strategy, under which the company is attempting to make over its current product line using the Internet, Lotus Notes and Asynchronous Transfer Mode technology: all of them supporting collaborative

computing over high-bandwidth networks.

This week's announcements

IBM'S NEW 'NET ROSTER

- ▶ PC SystemView
- ▶ RS/6000-based multimedia server
- ▶ Java for AIX
- ▶ Internet server software for OS/400
- ▶ Internet gateway to DB2/400
- ▶ AIX gateways for Internet access to CICS and DB2
- ▶ Internet Bonus Pack for OS/390

— aimed at helping users do business more easily on the 'Net — will include new World-Wide Web server packages for mainframes and Application System/400s, as well as new CICS, DB2 and Java support for the RISC System/6000.

See IBM, page 71

IBM gives LAN management tool a Web interface.

See page 21.

Cisco seeks to ease ATM traffic jams

THE ATM RMON LINEUP

- ▶ Axon
- ▶ Cisco
- ▶ Frontier Software
- ▶ Net2Net
- ▶ NetSys
- ▶ Network General

Monitor the latest in MIB news on Network World Fusion with resources that include:

- ▶ Specs for RMON and ATM MIBs
- ▶ A look at efforts to extend RMON to the public net
- ▶ An ATM primer

Select News+ then Front Page.

NetworkWorld
Fusion
<http://www.nwfusion.com>

By Jim Duffy

San Jose, Calif.

Cisco Systems, Inc. this week will announce a multivendor initiative to overcome one of the more troublesome aspects of ATM — lack of traffic analysis tools.

The company confirmed that it is working with five vendors to develop a Remote Monitoring (RMON) Management Information Base (MIB) for gathering management information from Asynchronous Transfer

Mode switches (see graphic, page 71).

RMON-type traffic monitoring and analysis tools have been nonexistent for ATM, causing some user consternation (NW, July 15, 1995, page 53).

"We don't want to follow in the footsteps of switched Ethernet. [When it emerged,] nobody knew how to manage it," said Marlon Drummond, an internal consultant at Credit Suisse in New York.

See Cisco, page 71

Cisco and HP are behind schedule in providing jointly developed VG products.

See page 70.

It's reorg time at Novell

By Kevin Fogarty

San Jose, Calif.

Novell, Inc., still reinventing itself, last week announced a corporate reorganization that dramatically repositions NetWare Directory Services (NDS), ups the focus on product bundles and shifts the spotlight from NetWare to the Internet.

The company abandoned its product group model and will instead focus on market segments. New units include:

- Distributed Networks Business Unit aimed at enterprise networks.
- Internet/Intranet Networks Business Unit.

See Novell, page 10

INSIDE


CAPITALIZING ON THE INTERNET
supplement

The vendors are at the starting gate, and it's time to place your bets on the Internet Derby. We handicap the contestants in four key Internet software races. Supplement follows page 38.

NETWORK WORLD UNPLUGGED

Blast-off!

Our special section reveals what's needed to get the mobile computing industry off the ground. Stories start on page 44.



3Com AND DELL:
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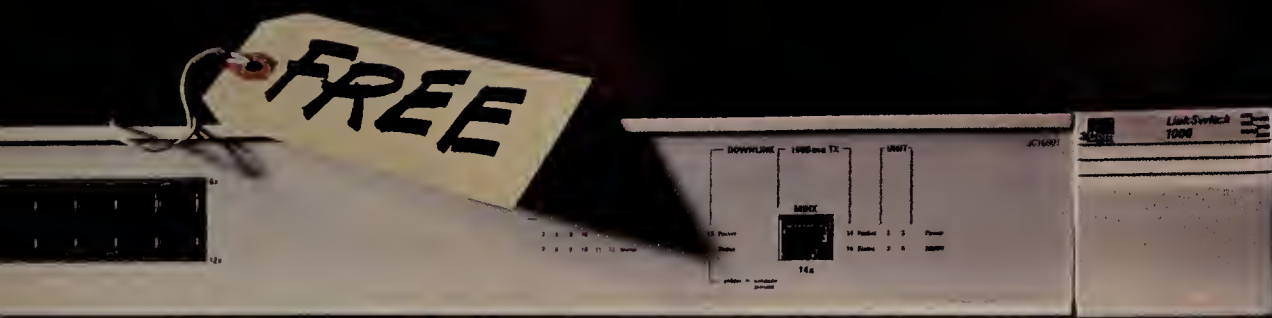
Look for more innovative product offerings in the months to come.

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This Week



News+

NetFlash:

You asked for more daily news. You got it. Starting this week, the daily NetFlash features expanded coverage of networking, from new products and services to the latest Internet and telecommunications reform news.

The Front Page:

- **Internet:** See just what Lou Gerstner says about network-centric IBM, and take a look at efforts to turn MVS machines into Web servers.
- **Frame relay:** See why AT&T asked for more time to file frame relay tariffs and how the FCC responded.
- **Sprint:** While the carrier's strategy to sell telephone service via cable systems may be in disarray, its Sprint Telecommunications Venture is still looking to crack the wireless market. Read up on its CDMA strategy.

The Technical Sections:

- **ODBC:** Pick up a white paper on what this technology is good for — and what it isn't good for — in Client/Server Applications.
- **FEDI:** Find out the words behind the number. Pick up detailed specs for the 820 transaction set, which is key to implementations of Financial EDI, in Electronic Commerce.
- **ADSL:** There's been a lot of on-line discussion recently about this high-speed, copper wire-based technology. Find out what people are saying, in WANs & Internetworking.



NetRef

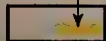
Technology Resources: Get complete test results from our new Server Test Series, including benchmark numbers for file server, database and Lotus Notes performance, in Buyer's Guides and Reviews.

this week's pick

Thinking about workflow? The Underground Workflow Module is a good on-line introduction to the subject. It's arranged like a subway map; you decide which information "stop" you want to go to and in which order. The train leaves from <http://cne.gmu.edu/modules/workflow/workflow.html>.

HOW TO GET ON TO NETWORK WORLD FUSION

At the welcome screen, click on First Visit and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label — handy during registration. Non-subscribers must fill out an on-line registration form.



NetworkWorld

Fusion

CONFERENCE PICK

HOT TOPIC

What do you think of on-line flame wars?

Jump into the fray on Network World Fusion (<http://www.nwfusion.com>).

Select Forum, Editorial Insights then Topic 4 — Ouch, ouch, ouch.

NetworkWorld

An IDG Publication

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WAL*MART

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UB Networks' Marius Abel (left) and Ronald Morita are part of a team prepping Java applets for troubleshooting. Page 6.



Get Un-Wired

Our special Unplugged section breaks down the obstacles to mobile computing. Starts on Page 44.

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NetworkWorld **PC WORLD**
SERVER TEST SERIES

DEBUTS on page 39.

NetworkWorld's Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.

News briefs, February 19, 1996

Cabletron takes aim at ATM

Cabletron Systems, Inc. has unveiled a bold Asynchronous Transfer Mode product rollout that will put the vendor ahead of its competitors in the ATM space, analysts said. New products will include a four-slot, stand-alone ATM switch, a 16-slot ATM backbone switch and a new 75G bit/sec backplane for Cabletron's Multi Media Access Control switching hub. All of the products will roll out over the next year.

Start-up readies IP-over-ATM switch

Ipsilon Networks, Inc. next month will introduce what it calls the first Asynchronous Transfer Mode switch that integrates IP routing and switching. The Palo Alto, Calif.-based start-up will use a method other than the Multiprotocol-over-ATM or RFC 1577 standards to accomplish network-level routing. The advantage of the scheme would be to put less strain on router processors and enable faster call setup times. Company officials refused to provide more details.

The OpenDoc is in

IBM last week released the beta version of its AIX-based OpenDoc software component architecture. When it becomes generally available in June, the product will let users run OpenDoc applications across networked AIX and OS/2 computers via IBM's Distributed System Object Model. The beta software is available from the IBM Club OpenDoc Web page (<http://www.software.ibm.com/clubopendoc>).

Banking buddies

Microsoft Corp. and Visa International, Inc. last week said they will work together to provide home banking and payment services that banks can offer to their customers. Microsoft's next version of its Money financial organization software, due out this summer, will support access to a new range of home banking services from Visa.

Decent proposal

Saying the statute failed to clearly define the term "indecent," a federal judge blocked enforcement of the Communications Decency Act's section that requires punishment for anyone who makes indecent material available to minors via a network. But at the same time, U.S. District Judge Ronald Buckwalter upheld a separate section aimed at "patently offensive" material.

Netscape's busy schedule

Netscape Communications Corp. is known for browsing, but the Mountain View, Calif.-based Web tools developer has been keeping up a hectic pace of late. Along with acquiring virtual reality software developer Paper Software, Inc. last week, Netscape released a beta version of Netscape Live3D extensions for Navigator 2.0, which implements Virtual Reality Modeling Language viewing technology and extensions to Sun Microsystems, Inc.'s Java and JavaScript. The company also is offering free beta versions of its Navigator Gold editor, which has a range of home page editing functions from the familiar Navigator environment but avoids direct HTML interaction.

Ma, Look@me, Look@me

Farallon Computing, Inc. of Alameda, Calif., is applying its remote access technology to the Internet with the scheduled release next month of Look@me, a document conferencing utility. Because Look@me draws on Farallon's cross-platform Timbuktu Pro technology, it supports real-time interactions across the 'Net between files on Macintosh and Windows systems.

Sockets to 'em

The WinSock Group this week is releasing a software developers' kit for Windows Sockets 2.0 on Windows NT. A beta version of the Windows 95 implementation is expected next month. The WinSock Group determines standard functions for the WinSock protocol, which facilitates communications between Windows desktop applications and Internet protocols. WinSock 2.0 supports IPX/SPX, Open Systems Interconnection and TCP/IP.

UB to lessen the load on network managers

Java provides hubs with smarts for automated management.

By Jodi Cohen

Santa Clara, Calif.

UB Networks, Inc. hopes to give its hubs so much intelligence that they could practically manage themselves.

UB says the key is distributed, rather than centralized, management. And for this, Java is just the ticket.

The company is readying a three-phase rollout of enhancements to its Empower net management platform. The core of the plan is to embed Java applets into the hubs so the devices can troubleshoot problems without user intervention. This built-in intelligence, along with the automated nature of the tools, may reduce the need to hire new net administrators.

Customers will be able to automatically control how their hubs operate by setting their own policies for things like bandwidth management and what

the Java applet in Empower — which acts as a Web server — and it will be executed in the workstation. This tool will allow net managers to access the network for real-time statistics from home or the road, as long as the administrator has access to a Web browser. Currently, UB net managers require a Simple Network Management Protocol management console.

Phase 2

What really has analysts and users excited are Phases 2 and 3. In the second stage of the roll-



UB's Abel (above) and Morita are working to see that net managers can troubleshoot problems without user intervention.



Phase 3

In Phase 3, UB will give customers tools to build their own Java-based management applications. Tools for building embedded applications are now very complicated, according to Marius Abel, senior vice president and general manager of the network products division at UB. But he said that it will be

very easy to use the Java language to develop applets, which can be downloaded from a workstation into Empower and executed within the UB framework.

Kurtiak said that allowing customers to develop applications is good news.

"By giving the users the tools to be able to create these applets, UB has, in turn, expanded its programming staff by thousands," he said.

But Kurtiak is concerned about possible incompatibility issues that could arise with customer-developed applications.

Ronald Morita, vice president of applications engineering at UB, said the firm plans to head off that problem by certifying the applications and then making them available through UB.

©UB: (408) 496-0111.

Java Empowers UB hub management

A Java management jolt will make Empower more of a distributed management platform.

Phase 1: Provides Web access into Empower for real-time graphical network management. Will ship in the summer.

Phase 2: Embeds Java applets, such as those for monitoring network utilization and load-balancing traffic, in its net devices. Will ship in the fall.

Phase 3: Gives customers tools to build Java-based management applications, such as critical node monitoring. Will ship in the first half of 1997.

action to take during certain alarm conditions. Most UB rivals just plan to use the Web to monitor net devices from a central console.

UB has partnered with Integrated Systems, Inc., an embedded operating system vendor based here, to use its PSOS operating system to create Java interpreters that will run in the hubs.

Phase 1

Like its rivals', UB's approach will initially only provide real-time graphical network management. In this stage, UB will store

out, UB will embed Java applets into its hubs to provide local intelligence and proactive management capabilities.

UB user Phil Kurtiak, director of IS at PHP, Inc., a health care facility in Greensborough, N.C., figures these tools will offset his current need for another net administrator.

"My whole goal is to be able to hold off going to senior management, saying that I need to hire another person to manage the network," he said. "Java will allow me to utilize my resources because the hardware will pretty

CORRECTION

In the Feb. 5 Ready to Roll chart on page 28, Shiva's ShivaIntegrator 100 and 500 remote access systems should have been listed as hardware products, not software.

HOW TO REACH US

CALL: (508) 875-6400; **FAX:** (508) 820-3467; **INTERNET:** nwnews@nww.com; **WRITE:** Network World, 161 Worcester Rd., Framingham, MA 01701; **NETWORK HELP DESK:** Having trouble resolving a technical problem, locating resources or getting a vendor to follow up on a promise? Contact the Network Help Desk at (800) 622-1108, Ext. 451, or cnerny@nww.com; **SUBSCRIPTIONS:** nwcirc@nww.com; **REPRINTS:** In quantities of 500-10,000. Call (612) 582-3800. **MARKET LINE:** For details about future editorial projects, call (508) 820-7557.



Unqueue

IN THE CROWDED BYWAYS OF Bangkok, one bank is doing its part to reduce traffic congestion.

With the help of IBM, Thai Farmers Bank has streamlined data handling at its branches to such a degree that customer transactions that once took 15 minutes now take 20 seconds.

By using IBM experience in the



banking industry, Thai Farmers Bank reengineered the way its branches process information, improving customer service while reducing employee overtime. What's more, Thai Farmers Bank is now able to devote three times as much space to customers by virtually eliminating the "back office" at each branch.

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AT&T caves in on its frame relay rate hike

By David Rohde

Washington, D.C.

Having apparently miscalculated its competitors' intentions, AT&T last week rescinded its recent frame relay price increase.

The move came hard on the heels of the first ever frame relay tariff filings the previous week by MCI Communications Corp. and Sprint Corp. (NW, Feb. 12, page 1). MCI and Sprint held prices steady even though AT&T two weeks earlier raised prices an average of 6% in the tariffs it filed to meet the Federal Communications Commission's Feb. 5 deadline for filing frame relay service tariffs (NW, Jan. 29, page 1).

"Reviewing what [MCI and Sprint] filed, we felt that we were not competitive," said Stephen Sobolevitch, product manager for AT&T's InterSpan frame relay service.

AT&T put its permanent virtual circuit (PVC) monthly charges back to exactly where they stood before its Jan. 22 tariff filing. AT&T also took back its port charge increase, then rounded figures off to \$10-per-month increments. In some cases, that means the port charges are actually slightly below where they stood before the price hike (see graphic).

The move triggered some relief, some caution and some chuckles among industry observers, who warned that carriers could still try to use the tariff process as a cover to hike prices.

Unlike with the old nonbinding price sheets, carriers are obligated to offer tariff rates equally

to all potential customers, but they can change them on one day's notice, even during the course of a user's term contract.

"A lot of people — a lot of users — were frustrated with" AT&T's price hike, said Steve Sazegari, principal at Tele-Mac, a consultancy based in Foster

City, Calif.

AT&T's Sobolevitch did not acknowledge any specific complaints from prospective frame relay customers. But he said, "We do listen to our customers, and our customers tell us to remain competitive."

One analyst suggested AT&T filed its price hikes early to signal its competitors, hoping they would follow suit with similar pricing. "Tariffs are an opportunity for carriers to collude; AT&T backed off because no one followed suit this time," said

Christine Heckart, senior broadband consultant at TeleChoice, Inc., a consulting firm based in Verona, N.J.

Heckart said she suspects that MCI, Sprint and LDDS WorldCom had already invested so much time and money in their initial tariff filings that they were not inclined to go back immediately and revise them upward to match AT&T's rates. "But there's nothing to stop that from happening a few months down the road," she said.

For now, AT&T's competitors said they would stand firm on their prices while getting in a few digs at the No. 1 carrier.

"How 'bout that?" chuckled an MCI spokesman when told of AT&T's reversal. "I guess AT&T really has decided to be competitive."

Senior Editor Joanie Wexler contributed to this story.

What's old is new again

Rates for AT&T's InterSpan frame relay service swing up, then swing down.

Price per month	Jan. 1	Jan. 22	Feb. 12
512K bit/sec frame relay port	\$1,378	\$1,475	\$1,370
56K/64K bit/sec permanent virtual circuit	\$101	\$110	\$101

SOURCE: AT&T, BASKING RIDGE, N.J.

Sprint cable deal dissolves

By David Rohde

Kansas City, Mo.

Ironically, just as the Telecommunications Act of 1996 has launched a wave of carrier moves into new markets, a key element of Sprint Corp.'s long-standing strategy to invade the local loop has unraveled.

Sprint and its three joint venture cable partners — Comcast Corp., Cox Cable Communications, Inc. and Tele-Communications, Inc. (TCI) — last month dumped their 1 1/2-year-old agreement to upgrade millions of cable lines to carry two-way voice and data.

The collapse of the arrangement throws into question Sprint's strategy for invading the local exchange market, al-

though the joint venture company, called Sprint Telecommunications Venture (STV), remains alive.

The breakdown also represents a big setback for users looking for an alternative network outside the control of regional Bell operating companies.

The Sprint deal snagged on a formula under which Sprint was supposed to compensate its three partners and other cable companies that wished to take part in the venture (see graphic).

The cable companies wanted Sprint to pay more to compensate them for the huge cost of making their cable lines telephony-ready, said Tom Mateer, STV's vice president of business development. And they balked at a requirement to telephony-enable cable facilities passing at least 10 million residences by the end of 1997, he said. But analysts said Sprint itself had grown disenchanted with the idea of relying so heavily on cable to invade the local loop because market research has shown cable companies to be poorly positioned to sell telephone service.

"The marketing tests have miserably failed," said Steve Sazegari, principal at Tele-Mac, a Foster City, Calif.-based consulting firm.

Mateer claimed otherwise, saying Sprint executives were "very enthusiastic" about Comcast's and TCI's results in

recent trials selling Sprint long distance.

Mateer said Sprint will continue to pursue local-loop opportunities by negotiating agreements with individual cable companies that would offer Sprint-branded local service. In addition, STV remains the nation's potential No. 1 player in the emerging personal communications services (PCS) wireless market, holding \$2.1 billion worth of federal licenses.

But like telephony over cable,

SPRINT DOESN'T WANT ITS STV

Under the now-scrapped deal among STV partners, Sprint would have paid cable TV companies the following:

\$1.75 per home or business passed by telephony-enabled cable lines

PLUS

22% of the revenue from Sprint-branded local exchange services

SOURCE: SPRINT, KANSAS CITY, MO.

the cost of a nationwide PCS buildout is phenomenal — estimated at up to \$8 billion — and the effort faces zoning protests in numerous communities. "We certainly recognize it's a huge undertaking," Mateer said. "We've got a long way to go."

Mateer said Sprint would now consider reselling capacity on RBOC networks rather than building its own networks.

But Mateer questioned whether specific resale price and interconnection arrangements would be in place anytime soon, and he insisted that Sprint still prefers to enter the local market with its own facilities.

Mateer acknowledged that

NetworkWorld PC WORLD SERVER TEST SERIES DEBUTS

This week marks a major step forward in our effort to deliver the kind of analytical information that's crucial to helping you meet your business needs.

On page 39, you'll find the first installment of our new Server Test Series. Each month, we'll bring you a succinct evaluation of up to six workgroup- or enterprise-level LAN servers that have been put through their paces in our new Server Test Center, founded with our sister publication, *PC World*.

At the center's helm is William Rinko-Gay, a 15-year industry veteran who most recently managed Compaq Computer Corp.'s Desktop Competitive Analysis Lab.

But we're not stopping at servers. We've also signed on Edwin Mier of Mier Communications, Inc. to help us provide in-depth analysis of products ranging from ATM and LAN switches to routers and SNMP managers.

Mier brings nearly 20 years of experience in the trenches of networking, as well as an impressive list of editorial credentials with publications including *Business Week*, *Byte*, *Communications Week* and *Data Communications*, not to mention *Network World*. Mier and his staff will wrestle with a host of equipment in their Princeton Junction, N.J., lab and report the results in forthcoming Test Series stories and Buyer's Guides.

We're committed to providing you with the information you need to make the right choices for your network. Tell us what you'd like to see by contacting Features Editor Paul Desmond at pdesmond@nww.com.

A B E N D

abend (n) 1: abnormal end to a computer process 2: the on-line fountain of 'Net wit and high-tech humor found on Network World Fusion (www.nwfusion.com).

Signs you are an Internet geek

(<http://mercury.cair.du.edu/kkauth/internetgeek.html>)

- When filling out your driver's license application, you give your IP address.
- You no longer ask prospective dates what their sign is; instead, your line is "Hi, what's your URL?"
- You're amazed to find out spam is a food.

Read the rest of Abend on-line and leave your own contributions. For more information on how to access Fusion, see page 5.

the development of telephony over cable had slowed since STV was formed amid great hoopla in the fall of 1994. He added that the RBOCs since that time had lost some of their zeal to compete with cable companies for video services, causing flagging interest among some cable companies in the telephony arena.

"Sprint did this in a very rushed mode," Sazegari said. "There was a lot of hype at that time about convergence." ■

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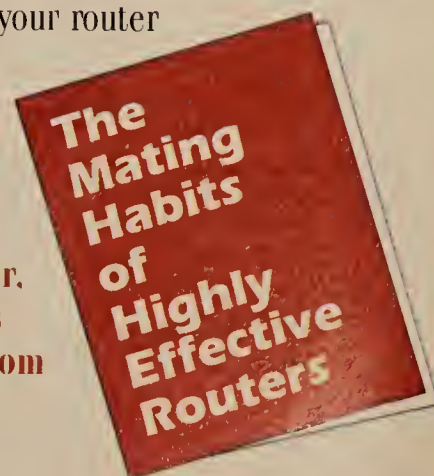
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Novell

Continued from page 1

■ SOHO (small office/home office) Networks Business Unit aimed at single-site networks.

These groups may be new, but they are ready to hit the ground running. For example, after months of hedging, Novell's new Internet/Intranet group finally clarified plans to port NDS to other operating systems, including Windows NT. NDS will run as a separate native NT application and will no longer be dependent on NetWare. "NDS is completely separate," said Vic Langford, senior vice president and general manager of the Internet/Intranet group.

The company has bigger things in store for NDS. It hopes to license NDS not only to network operating system vendors, but also to independent software vendors seeking a directory for their products.

In addition, it will offer NDS to Internet service providers as a pointer to information or even as a replacement for the Internet's

Domain Name Service. It may also license lightweight versions that could act as address books, Langford said.

Shooting to make it a directory-access standard, Novell will submit some of the NDS APIs to the Internet Engineering Task Force. On the flip side, the company is considering adopting public standards such as X.500's Lightweight Directory Access Protocol, a server-to-client communication protocol, said Steve Markman, executive vice president and general manager of the Novell Products Group, which includes all of Novell's product lines.

Adding to the NDS story, Novell is developing security and transactional capabilities to create a networked commerce service and an automated billing service, both of which will run on

multiple platforms and be available over the 'Net, he said.

"The real key to this is to have application developers able to write software that leverages the directory and can use any platform," Markman said.

WHAT'S IN A NAME?

Within the San Jose building complex that houses Novell's top-level executive staff is Cafe Cairo, a company cafeteria that shares a name with the code-name of the next version of Windows NT.

Sell! Sell! Sell!

On the sales side, Novell will no longer rely on sales of a slew of individual products. Instead it will sell integrated packages of products aimed at particular groups, he said.

As part of that strategy, the company is working on technology that would let it put all of its products on one set of CD-ROMs and let customers deploy them as needed. It also plans to let users download the applications from the Internet, Markman said.

The strategy depends on Novell continuing the development of its secure container

technology, which had been aimed at protecting the copyrights of materials sold over the World-Wide Web. Now Novell is applying that approach to applications and is working with a series of partners to develop security and billing technology.

The goal is to wrap applications in a secure container and launch a billing process when users open it. When the technology is done, Novell will issue APIs so third parties can sell their applications in conjunction with NetWare, Markman said.

'Net weighs heavy

NetWare itself will become more 'Net-friendly through a set of technologies dubbed InterNetWare. The name is not official and does not represent a single product. Instead it represents a direction for NetWare that includes close Internet integration, product packages that would make Internet gateways and Web servers standard parts of NetWare servers, and support for Java applications in NetWare, Markman said.

Among the first of Novell's bundles to hit the market will be a pair of offerings aimed at providing drop-in, all-in-one Web servers to NetWare users.

The first is an intranet package code-named Tarantula that will give users everything they



Read up on directory services development. Resources include:

- ▶ A look at Banyan's plans for moving directory services to the Internet
- ▶ A review of NDS
- ▶ White papers from Novell and Microsoft on why their individual directories are best.

Select News+ then Local Networks.

need to create a Web site on their internal corporate network, the company said. It will include an IP/IPX gateway, a Web authoring tool, the NetWare Web Server, a group of user licenses for Netscape Communications Corp.'s Navigator browser and a version of NetWare that can be either a run-time or full-function server, said Mark Griffiths, director of product marketing for the Internet Commerce Division.

The other package, referred to as InterNetWare Connect, will provide external Internet connectivity to NetWare networks, Griffiths said. It will include the Multiprotocol Router, NetWare 4.1, components of Unix Print

Managing with the enemy

Novell, Inc. will expand its horizons on the management front by giving its ManageWise package the ability to monitor and reconfigure Microsoft Corp.'s Windows NT Servers.

The company is working on a Simple Network Management Protocol agent that would reside on an NT Server and track its performance by reading information in NT's Performance Monitor and Event Log. It would convert that information to SNMP and send it to the ManageWise console or a third-party console.

ManageWise could then send reconfiguration commands to the agent, which would translate them to NT protocols to make changes on the server.

The agent is expected to be released this year.

—Kevin Fogarty

Services, the Domain Name Server from the NetWare TCP/IP implementation and an FTP server. The version of NetWare in that package could be either run-time or full-function. (The Domain Name Server would only be necessary with a run-time version of NetWare.)

A third package will combine the two and work with internal and external Web sites, Griffiths said.

A bigger NEST

Novell is still serious about embedded LAN technology. The company next month will ship a new version of the software development kit for NetWare Embedded Systems Technology (NEST) that includes support for common Internet protocols.

NEST Version 1.2 will include support for TCP/IP and Simple Network Management Protocol, said John Enslow, senior director of marketing business development for Novell's Extended Networks Division.

Support for TCP/IP and SNMP will make NEST-enabled devices more attractive because they will be able to function in IPX and IP nets and can be monitored and controlled by SNMP management applications.

The kit will also contain tools to build SNMP Management Information Bases that would define events in a way SNMP management applications could understand. ■

Novell breaks up into three product divisions

Reorganization aims to answer 'the needs of customers.'

By Kevin Fogarty

San Jose, Calif.

Novell, Inc.'s new organizational chart includes the SOHO (small office/home office) Networks Business Unit aimed at single-site networks, the Distributed Networks Business Unit aimed at enterprise nets and the Internet/Intranet Networks Business Unit.

In the past, Novell has organized by product group, a model that makes development very

efficient but makes linking several products into a single solution more difficult, said Steve Markman, executive vice president and general manager of the Novell Products Group, which oversees the various units.

"I'm swinging the pendulum back the other way, more toward marketing and answering the needs of customers," Markman said.

Longtime Novell stalwart Richard King, who has led the

NetWare products group off and on for years, was put in charge of the SOHO group. However, King abruptly resigned last week and was replaced by Ed Bartos, who was formerly in charge of national accounts.

This unit is charged with developing a bundle that will probably include NetWare, GroupWise, Internet access gateways, an agent for remote network management and a remote access product.

The idea is to give organizations with a single-site network an easy-to-install, integrated bundle of products that will fulfill their networking and communications needs without forcing them to learn the ins and outs of networking, according to Markman.

The Distributed Networks group will control the marketing and development of NetWare, and the management and interconnectivity products associated with it, including ManageWise, the Multiprotocol Router and NetWare Connect.

Markman leads the group but is searching for a replacement, he said.

The Internet/Intranet group will handle the NetWare Web Server, the AT&T NetWare Connect Service public network and the GroupWise electronic mail package.

Surprisingly, it also will own NetWare Directory Services, the directory that is the key to NetWare 4.1. ■

NOVELL'S NEW ORGANIZATION

Robert Frankenberg

Chairman and CEO

Steve Markman

Executive vice president and general manager

Group: Novell Products Group

Vic Langford

Senior vice president and general manager

Group: Internet/Intranet Networks Business Unit

Key products:

- NDS
- GroupWise
- NEST

Steve Markman

Manages temporarily

Group: Distributed Networks Business Unit

Key products:

- NetWare
- ManageWise
- Multiprotocol Router

Ed Bartos

Senior vice president and general manager

Group: SOHO Networks Business Unit

Key product:

- Unnamed integrated NOS/E-mail/Internet package aimed at single-site networks

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Sun promotes new API to forge Java-to-database links

By John Cox

Mountain View, Calif.

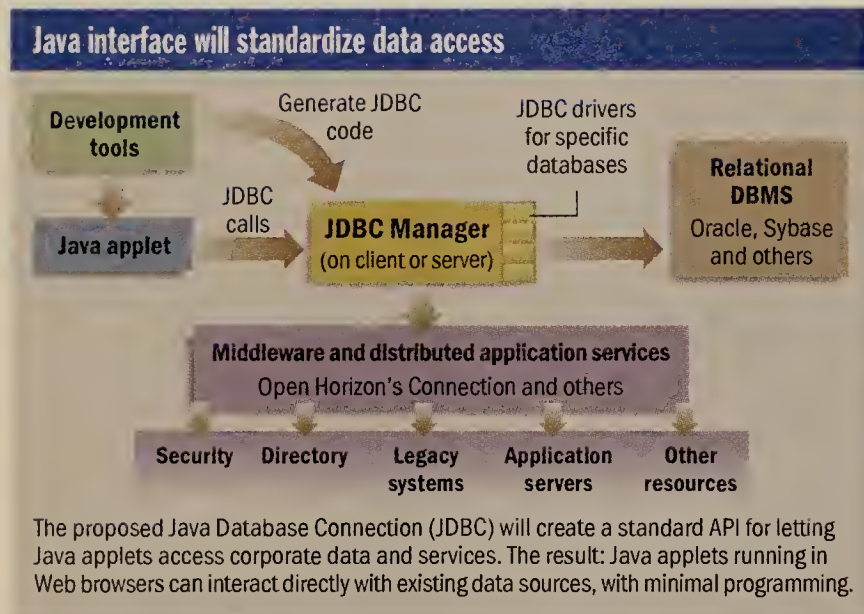
Sun Microsystems, Inc.'s announcement this week of a standard database access API for its Java language will make it much easier for application developers to integrate corporate data and business logic with Web applications, according to users and analysts.

Sun's Java Database Connection (JDBC) is an API that enables Java applets to access multiple database or middleware services capable of connecting the applets to security and directory services as well as application servers.

ODBC as Microsoft's data access product manager for the developers division. "I don't understand the 'value-add' of the JDBC proposition." There already is an existing data access standard — ODBC, he said.

But to others, the value seems obvious.

"What application developers really want is the ability to tie into corporate data stores to create the on-demand computing experience everyone is excited about," said Don DePalma, a senior analyst at Forrester Research, Inc. in Cambridge, Mass. "This [JDBC interface] is a natural development in the Java



The interface is analogous to the role of Microsoft Corp.'s widely adopted Open Database Connectivity (ODBC) interface. Some leading database, application development tool and software driver vendors that have implemented ODBC as the standard for client/server access to databases also plan to support JDBC.

Web applications today typically require laborious, low-level programming using the Common Gateway Interface (CGI) to connect with databases elsewhere on the net. Moreover, the CGI can cramp performance. The result: Many Web applications are simply document collections, written in HTML and viewed by Web browsers.

"We became aware of the need for this [kind of interface] near the end of last year," said Jeff Siegel, group manager of business development for Sun's JavaSoft division.

The JDBC document will be available to the public March 8 from Sun's Web site.

"Why is Java special?" asked Greg Nelson, who oversees

space that absolutely has to happen."

On the Open Horizon

Open Horizon, Inc. in Belmont, Calif., just announced its own \$99 Java applet called Connection for Java, which accepts JDBC calls from a Java applet and passes them onto the client portion of its Connection middleware.

This client connects with the Connection server, which in turn links with an array of distributed application services — such as directory, security and transaction monitors — as well as relational database management systems and C/C++ and COBOL applications.

One of the standards Connection uses is ODBC. Connection for Java will be available by June.

Sun officials said ODBC has taught important lessons about data access and that JDBC builds on these. "You won't see any innovation in database access from us," said Graham Hamilton, a JavaSoft distinguished engineer. "We're mirroring well-known concepts." ■

Oracle fleshes out Internet strategy

By Barb Cole

San Jose, Calif.

Oracle Corp. will broaden its Internet line this week by announcing its next-generation Web server, which will be the link between the Internet and the company's flagship database.

Oracle's Internet plans also include the development of a low-cost network computer and setting up a global Internet service provider later this year.

Oracle WebServer 2.0, to be announced here at Internet Expo, is designed with efficiency

and security in mind. It includes the Web Request Broker, which dispatches Web client requests and balances application loads between servers. The Web Request Broker can bypass the often-sluggish Common Gateway Interface, the scripting language used by most HyperText Transfer Protocol (HTTP) servers. It supports Java, Oracle's own PL/SQL dialect and C++, according to Doug Laird, senior director of Web System marketing at Oracle.

Oracle will also announce

new pricing for WebServer — a scheme designed for the huge and often unpredictable number of users on Web servers (see graphic).

Companies such as Oracle "are raising the bar on what constitutes a Web server," said Geoffrey Bock, an analyst at Patricia Seybold Group, Inc., a Boston-based market research firm. Whereas first-generation Web servers were essentially just HTTP listeners, the new breed is aiming to provide more robust server capabilities, according to Bock.

In Oracle's case, the company is boosting WebServer by offering various levels of integration

Oracle weaves new Web pricing

Stand-alone WebServer —

\$2,495

WebServer for hooking into Workgroup Version of Oracle7 —

\$5,900 per server with workgroup database

WebServer for hooking into Enterprise Version of Oracle7 —

\$64,000 per server

with other technologies, such as built-in hooks to the Oracle7 database and links to the company's Video Server and document-oriented Context Server. It is also pushing to make WebServer a platform for Web applications built with a variety of tools, including Java and Microsoft Corp.'s Visual Basic.

To that end, Oracle will offer WebServer Manager, graphical software that lets users do centralized administration of distributed Web sites via browsers.

"The most problematic part of Web development has been hooking in corporate databases," said Gene DeRose, president of Jupiter Communications, Inc., a New York-based market research firm.

"Oracle has a real opportunity because they can focus on their strengths in the database area," DeRose said.

WebServer 2.0 will shore up other shortcomings in many Web systems by offering data encryption from the browser to the Web server, user authentication at the server and support for its Secure Network Services, which provides secure access to corporate data through a firewall.

WebServer 2.0 will be available in March on SunSoft, Inc.'s Solaris and Windows NT.

©Oracle: (415) 506-7000.

Flurry of activity follows the signing of new telecom law

By Tim Greene and David Rohde

Washington, D.C.

President Clinton's signing of the Telecommunications Act of 1996 has stirred up a hornet's nest, with carriers rushing out grandiose plans and federal officials trying to urge caution.

To help you monitor the cataclysmic change, *Network World* introduces "Telecom in Transition," a weekly feature. In last week's activities:

■ Bell Atlantic Corp. filed to offer land-line long-distance service in five states outside its region.

The carrier hopes to start offering service in North and South Carolina, Illinois, Florida and Texas by the end of the second quarter. That is the most ambitious schedule announced by any local exchange carrier.

Bell Atlantic plans to set up shop in the most lucrative markets, mirroring the "skim the cream" practice of competitive access providers. The carrier said it would announce in a few weeks the name of the long-distance provider whose services it will resell.

■ Ameritech Corp. announced national and international cellular long-distance service with flat-rate, per-minute billing regardless of time of day. The prices are 16 cents, 18 cents and 24 cents per minute, depending on which usage plan the user falls into.

■ Federal Communications Commission Chairman Reed Hundt said he does not expect regional Bell operating compa-

nies to file official applications to offer in-region, long-distance service until the FCC lays out its expectations for implementing a competitive checklist that RBOCs must meet to offer that service.

That process is expected to take several months. But Ameritech did say its plans in that area.

■ Ameritech expects to offer land-line long distance in its territory within nine to 13 months, certainly in Illinois and Michigan, but perhaps in all five Ameritech states, according to Steve Nowick, president of

Ameritech's long-distance subsidiary. Ameritech officials claim they have a jump on other RBOCs because the firm was already working toward complying with a local-competition checklist very similar to the one required by the telecommunications law.

■ Bell Atlantic sued AT&T, claiming its equipment arm, now called Lucent Technologies, Inc., is making it difficult for Bell Atlantic to move forward on competitive service offerings because it maintains a closed platform on its central office (CO) switches.

A Lucent spokeswoman said the company was "surprised" by the suit, noting that Bell Atlantic has long been able to choose CO switch vendors other than AT&T.

■ LDDS WorldCom scored its second major long-distance reseller agreement from a local exchange carrier since the law took effect, landing Ameritech.

The week before, LDDS won a

See *Telecom*, page 70



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Briefs

■ **OpenConnect Systems, Inc.** last week announced it will support Sun Microsystems, Inc.'s **Java** with its 3270 terminal emulation software. The Web 3270 Java Server will let SNA users log on to remote SNA hosts over a TCP/IP backbone or to TCP/IP applications via a single server.

OpenConnect Systems: (214) 484-5200.

■ **NYNEX Corp.** last week started taking reservations for **888 phone numbers**, the designated digits for toll-free numbers to be activated March 1.

■ **U.S. Robotics** is shipping **ISDN Primary Rate Interface** capabilities for its Total Control Enterprise Network Hub. PRI support on the Total Control hub ranges from \$5,995 to \$11,995.

U.S. Robotics: (708) 982-5001.

■ **Peregrine Systems, Inc.** last week announced **StationView** and **ServerView Version 2.0** for Novell, Inc. **NetWare**, which support **NetWare Directory Services**. Peregrine also announced versions of **StationView** and **ServerView** for Windows NT and Compaq Computer Corp.'s **Insight Manager**. Purchased together, **StationView** and **ServerView** cost \$13,000.

Peregrine: (800) 638-5231.

■ **US WEST Communications, Inc.** has put the Boulder, Colo., **Yellow Pages on the Internet**. Boulder is the first city in US WEST's 14-state territory to be World-Wide Webified.

■ **IBM** last week announced **Disaster Recovery Manager (DRM)**, a software program that automates enterprise disaster recovery. DRM lets users build recovery scripts that identify essential servers, databases and other resources that would be recovered automatically in the event of a disaster. The package backs up these essential systems to a remote disaster recovery location.

DRM will be available for AIX servers on March 29. It costs \$10,000.

IBM: (800) 442-6773.

GTE off and running in fast Internet access trial

By Tim Greene

Irving, Texas

GTE Corp. is running a trial of an Internet and remote LAN access service that gives users full 4M bit/sec bandwidth over conventional telephone lines.

The Asymmetric Digital Subscriber Line (ADSL) trial in the Dallas-Fort Worth area is the first to focus on using the technology to support data services.

Until now, ADSL has been used only for video-on-demand trials by Bell Atlantic Corp. ADSL uses the existing phone service twisted-pair wiring and augments it by attaching modems at the user end of the line and in the carrier's central office.

For the purposes of the trial, users will be able to receive data at 4M bit/sec and send at 500K bit/sec. The potential on an

ADSL line is 6.144M bit/sec downstream and 640K bit/sec upstream.

The lines are essentially dedicated links carrying TCP/IP and analog voice traffic to the GTE central office, where it is routed to the Internet or to corporate IP networks, said Bob Olshansky, GTE Laboratories' manager of advanced services platforms.

Modems for the trial, manufactured by Aware, Inc., are priced at \$2,500.

Beth Gage, broadband consultant at TeleChoice, Inc., a consultancy in Verona, N.J., said the cost for modems has to come down to between \$500 and \$1,000. Pricing is at the "chicken-and-egg stage" right now, where the price is dependent on the volume carriers will commit to ordering, she said.

"Carriers are saying, 'How much does it cost?' And vendors are saying, 'How many do you want?'" Gage said. Aware said prices could drop by the end of the year or early 1997.

"The trial will enable us to learn how ADSL operates in the public network and determine if a commercial offering is pru-

Get more ADSL info on Network World Fusion (<http://www.nwfusion.com>), including:

- ▶ ADSL primers
- ▶ A look at one company's plans for an inexpensive ADSL Web box
- ▶ Links to ADSL vendor sites

Select News+, then WANs & Internetworking.

Network World Fusion

dent," said Jeff Kissell, GTE assistant vice president for telephone operations.

GTE regards the technology as an alternative to T-1 or frame relay for users that cannot justify a separate dedicated line.

The six-month GTE trial involves a public library, a bookstore and GTE employees. The Irving Public Library will link the LANs of two branches and connect them to the Internet with ADSL. ProTech Books will use the service for Internet access, and GTE employees will use it for telecommuting.

Howard Maher, vice president of marketing for ProTech

Books, said his store wanted faster Internet access for its computer bar, where customers can use a row of PCs to access the Internet and try out software that comes with books.

He had been considering buying T-1 service from an Internet provider but instead opted to participate in the trial. ■

ISDN vs. ADSL

Asymmetric Digital Subscriber Line (ADSL) works by pumping high bandwidth through normal phone lines.

Sound familiar? It's exactly the same thing promised by another service known mostly by its acronym — ISDN.

ADSL outstrips ISDN for sheer bandwidth, offering 6.144M bit/sec downstream and 640K bit/sec upstream. ISDN supports just two 64K bit/sec bearer channels and a 16K bit/sec signaling channel.

ADSL is seen as a way for phone companies to defend against cable TV modems invading the market for high-speed Internet and remote LAN access, according to GTE Corp., which is trialing the service.

One differentiator is that ISDN is a dial-up service meant for periodic use and ADSL is a dedicated line that handles more constant demand.

GTE said ADSL will sell to remote office or home users who want T-1 bandwidth to download large files but find the cost of a T-1 prohibitive.

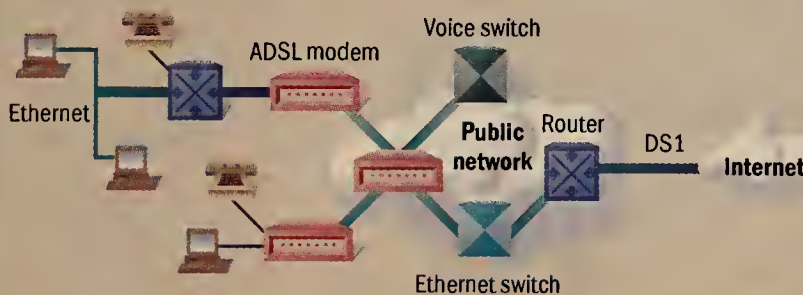
In the GTE model, ADSL would be a direct pipeline to a central office router, where TCP/IP traffic would be routed to the Internet or corporate virtual private network. This would eliminate interoperability problems.

Another advantage ADSL might have over ISDN is that the ISDN customer premises equipment (CPE) of one user must be interoperable with the CPE at the other end of the call. With ADSL in the GTE model, the user CPE need only be compatible with the carrier network.

— By Tim Greene

ADSL SPELLS FAST

GTE's Asymmetric Digital Subscriber Line service supports both voice and 4M bit/sec TCP/IP traffic over a standard phone line.



GRAPHIC BY TERRI MITCHELL

Sterling looks to ease SNA operations management

By Michael Cooney

Reston, Va.

Sterling Software last week announced new mainframe-based software designed to ease the day-to-day operations of large-scale SNA nets.

Solve: Operations for SNA is the latest component of Sterling's Solve family. The tool is intended to reduce SNA operational costs by providing real-time monitoring of enterprise SNA resources and improving automation capabilities.

Solve is an evolving suite of

software tools for mainframe-based NetView and workstation-based management platforms such as Hewlett-Packard Co.'s OpenView. Sterling is positioning Solve as a new operations management framework capable of letting users get a better handle on how network outages and application bottlenecks affect their business.

For example, Solve: Operations for SNA lets net administrators group and monitor users according to the work they are

See Sterling, page 17

Xyplex to uncap router bottlenecks

By Jim Duffy

Littleton, Mass.

Xyplex, Inc. is looking to make routers less susceptible to bottlenecks by making them more intelligent.

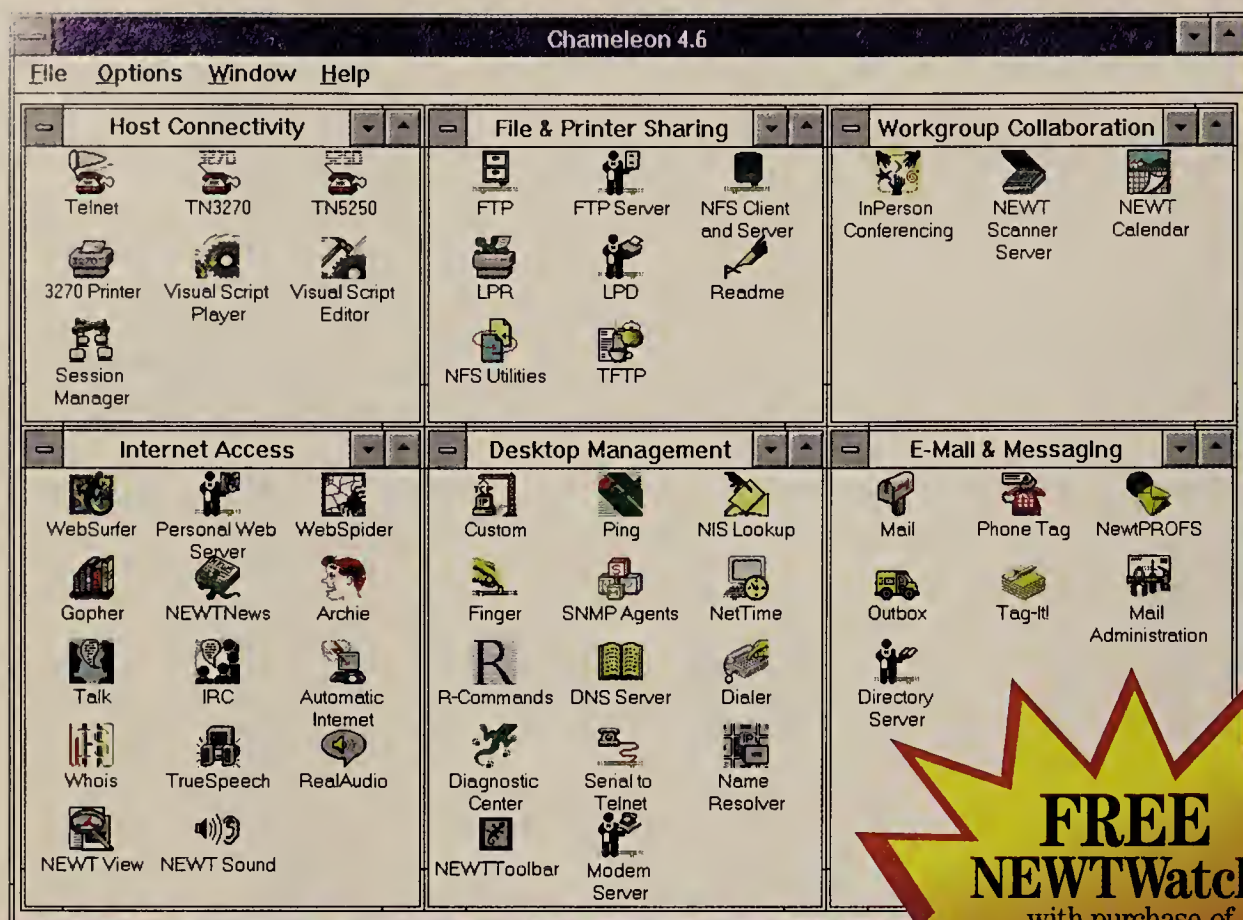
The company has unveiled a software architecture, called WANScape, that allows Xyplex routers to automatically fire up an additional wide-area link if the primary circuit is maxed out or congested. Xyplex also brought out a new remote access router that supports WANScape.

WANScape lets users deploy any combination of WAN ser-

See Xyplex, page 17

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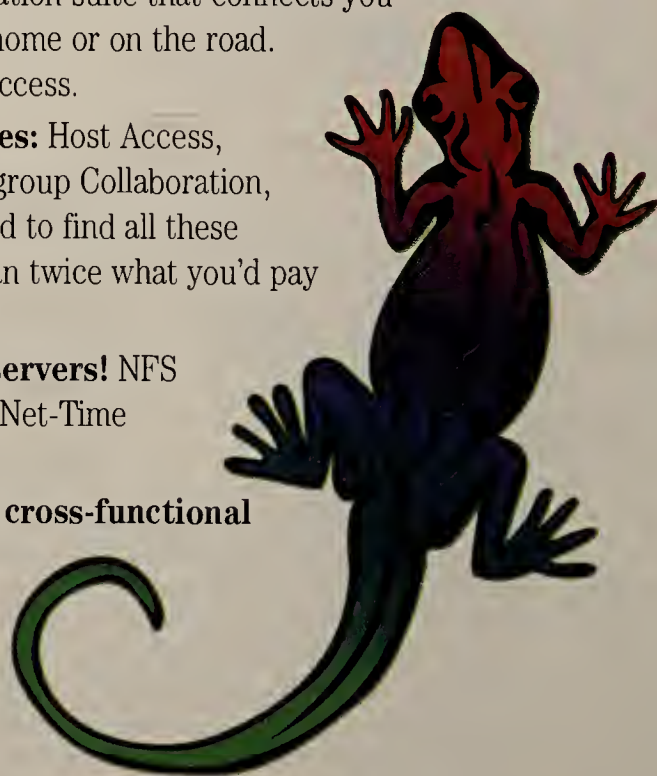
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Make unveils router modeling tool

By Jim Duffy

Mountain View, Calif.

Make Systems, Inc. has launched a new version of its network design and simulation software that allows users to model networks anchored by multiprotocol routers.

Release 2.4 of NetMaker XA features a new software module, called INET Designer, that enables users to evaluate the performance implications of existing and proposed network designs by modeling the behavior of multiprotocol routers. When combined with other NetMaker XA tools, INET Designer also allows users to evaluate tariffing and optimize the capacity of WAN links.

INET Designer is intended to help network managers:

- Generate a minimum cost topology that satisfies network transmission requirements.
- Design networks for continuous uptime.
- Evaluate incremental expansion options to accommodate additional users or applications.

■ Validate the price and performance of an existing topology.

■ Create and compare topologies under different traffic load conditions.

GTE Government Systems in Chantilly, Va., is using INET Designer to build a global router network.

"Because of the large number of permutations that are pos-

Make my net

Make's INET Designer...

... enables users to model the behavior of multiprotocol routers...

... which is important in evaluating performance aspects of existing and proposed network designs.

sible, it's a very difficult problem" to design the optimal router network, said Gene Plichta, manager of systems and technologies at GTE Govern-

ment Systems. "If you have a 10-node network, there's actually 3.5 x 10 to the 13th possible topologies. When you get up to a network of 100 nodes, there's more permutations than there are particles in the universe."

Make Systems is not the only one in this game: NetSys, Inc. recently unveiled packages that do modeling for Cisco Systems, Inc. routers (NW, Jan. 29, page 26).

"What Make is doing is tying the router design into this idea of overall network visualization, building a big picture of the whole network," said Tim Wilson, senior consultant at Decisys, Inc. in Sterling, Va.

"NetSys is very router-centric," he said. INET Designer costs \$7,500 and is available now.

©Make: (415) 941-9800.

Sterling

Continued from page 15

doing — such as billing, inventory or payroll. If there is an outage or bottleneck, administrators can directly correlate its effect with those business areas, said Ian Clayton, product manager for Solve products.

"The idea is to get users concentrating more time on the network problems that have the greatest impact to the company and its bottom line," Clayton said.

Solve: Operations for SNA resides on the mainframe as an MVS application. Once installed, it automatically discovers network resources, such as communications devices and lines. It keeps its own database of these

resources and works by monitoring MVS for application messages and VTAM for SNA network activity.

Solve: Operations for SNA can present enterprise resources to a NetView or Net/Master screen on the mainframe or to a graphics-based monitor on OpenView or IBM's NetView for AIX platform. In order to use NetView for AIX or OpenView, however, users need to deploy on those systems Solve: Commander, Sterling's Simple Network Management Protocol-based application.

Automation routines can be tied to Solve: Operations for SNA so, for example, a failed device could be restarted automatically without user intervention.

Solve: Operations for SNA is available starting at \$15,000.

©Sterling: (800) 247-5163.

"The idea is to get users concentrating more time on the network problems that have the greatest impact to the company,"

Ian Clayton said.

WAN MONITOR

Is the glass nearly full or nearly empty?

One cannot be a columnist dealing with data networking and not comment on the Telecommunications Act of 1996 (to quote its official short title). Just about everyone agrees that this new law is the end of the world as we know it. For some, it ushers in an era of great good. Others see only harm. To read the commentators, no one seems to think in other than these stark terms.

There seems to be something in the human psyche that likes to reduce complex decisions to simple truths. This is a very complex law, and like almost all products of the legislative process, contains portions that reflect the influence of individual legislators. Somehow, it seems that people are more comfortable focusing on a few paragraphs in a 280-page document than on the document as a whole.

There has been a huge outcry over the law's attempt to regulate "obscene or indecent" communications to persons under 18 years old. The specific rules that try to do this comprise only about 220 words out of a total of 46,248 in the law. There must be something else in there, but you would not know it from some of the recently published polemics.

I happen to dislike this section quite a bit. I feel that the government helps me quite enough, thank you, without protecting me from what 7-year-old children should not see or read. But I will admit that I fail to see what the Armageddon feeling is all about. Many of the vitriolic messages I read on various mailing lists said, "Stop this clearly unconstitutional bill."

If it is "clearly unconstitutional," what is the issue? The courts will quickly toss it out. Perhaps the fear is that the courts will not agree that it is "clearly unconstitutional." It will cost some money

to fight, and I expect to contribute to the ACLU for this cause.

In addition, the fact that it is no more possible for Internet service providers to control the content of transmissions than it is for telephone companies to control swearing on the phone line — which is illegal, by the way — is bound to sink in eventually, at least with the courts. I would rather

build tools to help parents than rules to inhibit discourse.

There seems to be a feeling that Congress can be persuaded to remove this provision from the new law. You gotta be kidding. How would you like to run for reelection with an opponent claiming in the now-normal not-so-nice-guy TV ads that you are pro-porn?

So backing up from a 2-inch view of 0.5% of the new law to look at the whole, you'll find there is much to the law that will fundamentally change what we now know as the Internet. The main thing it will do is to make it much more likely for us to see competition for the pipe and the services on it that run into homes and businesses.

It is just this type of competition that has brought the cost of Internet access down from hundreds of dollars per month to \$19.95. Meanwhile, the lack of competition in the old telephone world led to the stately development over 15 years of ISDN and over 30 years for cellular phones.

All in all, I think the glass is filling up and I'm looking forward to the next few years.

Disclaimer: I'm expressing my own opinions. There will be Harvard lawyers on all sides of these issues (all the better to charge you, my dear).

Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.



Scott Bradner

Xyplex

Continued from page 15

vices — leased line, asynchronous dial-up, ISDN or frame relay — simultaneously without requiring new hardware or reconfiguring routing policies, Xyplex said.

With WANscape, users can change WAN services quickly based on application requirements or changes in tariffs or service availability, the firm said.

For example, a network manager can establish a performance threshold for a primary frame relay link and instruct the router to bring up an ISDN link whenever that threshold is reached. The router will aggregate throughput over the frame relay and ISDN circuits simultaneously until the ISDN link is no longer necessary, at which time the router will automatically tear it down.

WANscape will be embedded in all Xyplex bridge/router products, including the chassis-based Network 9000 central-site router, the Network 3000 for regional offices and the new RouteRunner remote office

device.

Labatt Brewing Company, Ltd. in Toronto is using WANscape for WAN link backup on its Network 3000 network.

"Right now, we have it set so if we need additional bandwidth in a primary network failure, it'll use an ISDN link to bring up that link for us," said Len Thorne, telecommunications manager at the brewery.

The RouteRunner is available in two fixed-configuration models: synchronous and ISDN.

The synchronous model features one LAN and two WAN ports — asynchronous and synchronous — that support speeds from 56K to 2M bit/sec.

The ISDN version sports one LAN and one ISDN Basic Rate Interface.

RouteRunner routes TCP/IP, IPX and AppleTalk protocols. The synchronous version costs \$1,495, and the ISDN model costs \$1,395. Prices do not include data service units/channel service units or ISDN NT-1 equipment.

Both products are available now.

©Xyplex: (508) 952-4700.

Xyplex's WANscape architecture

- **Enables** Xyplex routers to fire up a leased line, asynchronous dial-up frame relay or ISDN link to relieve congestion on a primary circuit.
- **Aggregates** throughput over multiple circuits simultaneously until the backup link is no longer necessary and is torn down.
- **Decouples** routing policies and bandwidth management functions from WAN service connection.



Kevin Dee knows that speed isn't the

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only thing.

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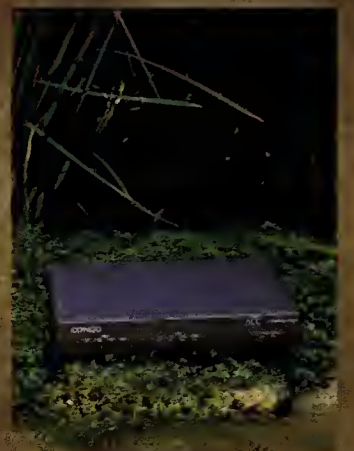
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Briefs

■ As expected, **Hewlett-Packard Co.** last week announced a two-port **100VG-AnyLAN** module and a one-port **100Base-T** module for its 16-port **Advance-Stack 10/100 LAN switch** (NW, Jan. 22, page 1). The modules allow customers to link Ethernet and fast Ethernet workgroup networks or provide a high-speed server connection. The 100VG-AnyLAN module costs \$1,999, and the 100Base-T module costs \$1,399. Both will be available in March.

HP: (800) 533-1333.

■ **Performance Technologies, Inc.**, a LAN switch vendor in Rochester, N.Y., last week unveiled an **Ethernet switch** with integrated routing capabilities. The **Nebula 2000** is an eight-port store-and-forward switch with a WAN port for Internet and remote access.

The device provides protocol filtering software — typically found only in expensive routers — that allows users to create protocol-based firewalls and control broadcast storms. Pricing for the Ethernet switch starts at \$3,995. It will be available in the second quarter.

Performance Technologies:
(716) 256-0200.

■ Hub maker **LANCAST** last week announced at **Networks Expo Boston '96** a modular backbone hub that allows users to connect **Ethernet and token-ring** network segments. The **SuperHub 5000** is a 12-slot chassis that can support as many as 264 10 Base-T ports or 132 token-ring ports. A mix of Ethernet and token-ring modules can be used and managed via a **Simple Network Management Protocol**-based management application. The hub chassis costs \$2,695, and individual Ethernet or token-ring modules range from \$1,095 to \$1,895. All are available now.

LANCAST: (603) 880-1833.

IBM gives LAN control tool a Web interface

By Ben Heskett
Somers, N.Y.

IBM this week will give its desktop and server management software a new look and a new name.

PC SystemView 4.0, the latest edition of what was previously IBM's NetFinity product, will enable net administrators to monitor PC and server performance via the Internet. IBM has also added the ability to manage systems running Windows NT.

Version 4.0 can be used to turn any machine with a Web browser into a PC SystemView management console. A typed-in code provides access via the 'Net to a server running PC SystemView Manager software with Web-enablement code. Security is ensured via 64-bit encryption and encoding, IBM officials said.

Once logged on to a network, an administrator can use PC Sys-

temView to manage desktop or server performance, configurations, problems, security and more.

The best thing about the new version is that it gives net managers more flexibility, such as dial-up access to the network, said Brian Howson, a LAN administrator for Brown Brothers Hariman & Co. in Jersey City, N.J. But he said a Web interface just isn't the same as a full-featured graphical user interface. "[It lacks] a real windowed application," he said.

Analysts noted that the Web interface gives IBM an edge over rivals, at least temporarily. "It puts them ahead of the competition because they are the only ones offering that functionality," said Lynda Fitzpatrick, an analyst with International Data Corp. (IDC), a Framingham, Mass.-based consultancy.

ning OS/2, NetWare, Windows 3.X, Windows 95 and DOS.

Bundle bonanza

IBM this week will also announce a series of Web server bundles, adding to the long line of vendors that see a market in Internet-ready hardware/software solutions.

"You're not doing brain sur-

gery in terms of new hardware features and functions," said Susan Frankle, an analyst at IDC. "But you're providing a value-add in terms of the bundle."

IBM is packaging its PC Server 320 with the company's own Internet software and software from Netscape Communications Corp.

©IBM: (800) 426-2968.

IBM gets caught up in the Web

Product	Description	Availability
PC SystemView 4.0 (formerly NetFinity)	New edition of LAN management product outfitted with HTTP- and HTML-enabled Web browser.	May
PC Server 320 Internet servers	Configurations include Windows NT and Netscape's Commerce Server; IBM's OS/2 Warp Server and Internet Connection Secure Server; and SunSoft's Solaris and NetScape's Commerce Server.	May

Digital and Agile enhance their VLAN offerings

By Jodi Cohen

LAN switching customers not yet sold on the idea of virtual LANs may like what Digital Equipment Corp. and Agile Networks, Inc. had to say last week. The companies made separate announcements that focused on VLAN interoperability and improved management capabilities, respectively.

Digital has based the VLAN software for its Asynchronous Transfer Mode switches on the ATM Forum's LAN Emulation (LANE) standard, which defines how applications designed for traditional LANs can be run on ATM LANs. Using any vendor's LANE-compliant device, net managers can logically link physically separated users over an

ATM backbone.

"These VLANs are created via industry-standard switched virtual circuits, which makes this a truly nonproprietary VLAN implementation," said Peter Dunbeck, business manager of high-performance networks at Digital.

The multivendor support appeals to Digital ATM switch customer Peter Evans, senior research associate at the University of Miami.

"If I'm using ATM as a high-speed backbone, I'd encapsulate my Ethernet traffic, ship it over to the correct place in another building and then break the data back out into the respective VLANs," he said. "This will work even if my Ethernet switches

aren't Digital boxes, as long as they support LANE."

Most networking vendors have VLAN capabilities, but they only allow net managers to create logical workgroups using one vendor's products.

In addition to the LANE support, Digital introduced new adapters and enhancements for the GIGAswitch/ATM and DEC-switch 400 ATM switches (see graphic).

Agile's ATMman

Separately, Agile rolled out a new release of its ATMman VLAN management software that gives net administrators better control over network node adds, moves and changes.

ATMman is a Simple Network Management Protocol-based application that manages Agile's ATMizer family of Ethernet and ATM switches. The version offers Global Endstation Identification, a feature that allows users to identify the physical locations, media access control address, protocol type, network layer address and name, and network function of each network endstation.

In addition, the release provides a feature that informs network administrators of any new, changed or duplicate IP addresses on the network.

©Digital: (508) 493-5111; Agile: (508) 263-3600.

VLAN product blitz breakdown

Product	Vendor	Pricing	Availability
ATMworks 350L, a PCI-based 155M bit/sec ATM adapter with LANE client support	Digital	\$995	March
ATMworks 950L, an Sbus-based 155M bit/sec ATM adapter with LANE client support	Digital	\$1,295	March
Firmware for GIGAswitch/ATM switch including UNI 3.1 support	Digital	Free	On Internet within 60 days
Nine-slot chassis for DECswitch 400 Ethernet-to-ATM switch with LANE client support	Digital	\$6,850	Now
ATM VLAN Manager	Digital	\$495	May
ATMman VLAN Policy Management software	Agile	Free for existing customers; \$1,500 for new ones.	Now

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The pitfalls of bypassing the Windows 95 logon screen

Those of you with Windows 95 machines running on your network might be tempted or asked to let certain end users bypass the operating system's graphical logon screen.

I'm here to tell you it's not such a good idea to automate the password process by

caching it in a file on the machine or something along those lines. In fact, you'd be better off not giving the machine a password at all.

I know that you may run into several candidates for bypassing the logon screen. Most often, it will be an E-mail post office engine, a back server or some other

nonhuman network user that needs to log on to the network to perform a service. Then there is your corporately powerful but computer-challenged end user — perhaps your boss — who has an inability to remember passwords or type them in correctly. And, of course, there are the masses of other end users who might also have difficulty when it comes to choosing and remembering passwords.

But here's why bypassing the logon screen is a bad idea.

First, you'll be sorely tempted not to require password changes on this account since you probably would have to make the change in the file holding the password by visiting the machine. This means your office hacker would have an endless amount of time to guess the password.

Second, as you know, any secret password that is written down is no longer a secret. A password contained in a batch file, text file or Windows 95 password file (extension: .PWL) is hardly more secure.

This leads us to the truism that the system isn't secure unless the hardware is physically secure.

In turn, this leads to the solution, at least for those nonhuman network nodes.

Correction

I recently ran the wrong Web address for the Randy Burgess Windows 95 Web page featuring Kent Bentkowski's Frequently Asked Question (FAQ) document about the Registry in Windows Help format. The correct address is <http://www.concentric.net/randybrg/win95.html>.

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As stated above, this is usually a machine performing some back-end function, such as an E-mail or job server. The purpose of piping the password to the logon command line would be to automate the process of booting the machine, letting it attach to the network and start performing its function. Power outages, server crashes and other events can be recovered from by having anyone — not necessarily you or another IS member — armed with the password.

But the best way to handle this situation is to physically secure the PC behind a locked door, then remove the password entirely. At the same time, those of you who are Novell, Inc. customers can run NetWare's station restriction option to limit a user name to a particular node ID. So the only way to log on as that user is to do so from that PC.

While this might work for your boss, don't try this for everyone in the company. You can't lock them all up, no matter how much you'd like to.

Instead, educate the end users. You might even use shock tactics: Show them how easy it is to log on under their ID and send forged E-mail.

Kearns, a former network administrator, is a freelance writer and consultant located in Austin, Texas. He can be reached at dkearns@msn.com.

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NET RESULTS



Skip MacAskill and Melinda Le Baron

Can anyone stand up to Cisco?

When the talk turns to routing, Cisco Systems, Inc. undoubtedly is the first thing that comes to mind.

It is this fact that has stifled router development by all major internetworking competitors except Bay Networks, Inc. with its Wellfleet router line and Fore

Systems, Inc. with its recently acquired Alantec Corp. technology.

Switch and hub vendors are unwilling to add routing in any form. After all, what's the sense in trying to compete head-to-head against Cisco in this area?

Just look at what vendors are doing — or not doing:

■ 3Com Corp. is de-emphasizing its Net-Builder product line for anything beyond remote access, even though the company is one of the few with a comprehensive routing software stack.

■ Cabletron Systems, Inc., which has an OEM agreement with Cisco for routing technology, denies the need for routing in its Virtual Networking Service model.

■ Madge Networks, Inc. has no routing technology and has no plans for it.

■ UB Networks, Inc. has an OEM agreement with router maker Advanced Computer Communications for low-end products and resells gear from Bay and Cisco.

■ Hewlett-Packard Co. has low-end routers but nothing in the backbone space.

These vendors concede that they cannot compete with Cisco in routing and acknowledge that the investment in trying to do so would be too high. They feel their time and resources are better spent on switching, including Asynchronous Transfer Mode technology.

Most of these vendors have stated that routing will continue to be an essential technology, that the segmentation and protocol provided by routing will be necessary in any large network environment. They also admit that this need will not disappear in the foreseeable future.

So you go out and buy a router. Here's what happens: The internetworking players are forced to explain how Cisco's or others' routers fit into their long-term strategy, or present you with a Flat Earth Networking—routerless—solution.

The first option assumes you want to build a multivendor network and also gives the router vendor an opportunity to bid for your switch purchases.

The Flat Earth Networking option just won't fly for large installations.

Either way, the routerless internetworking vendors are forfeiting the future. Not only are they conceding the routing ground, they also are giving up ownership of a strategic technology that will be ported to different platforms, eventually replacing the large installed base of collapsed backbone routers.

By doing this, they acknowledge that future backbones will be based, at least in part, on the technology of Cisco, Bay or Fore.

Are these three vendors the only ones to shoot for a realistic solution? Has Cisco, as routing behemoth, intimidated most networking vendors out of a key part of the industry? Can other vendors survive without routing—relying on one of these three to provide product and technology?

We hope the answer is not as clear as it appears, for we expect start-ups that include routing in their products will end up as grist for the acquisition mill. If anything, it does ensure the future of Cisco, Bay and Fore and that their technologies will play a key role in other internetworking vendors' strategies.

Le Baron is a research director and MacAskill a senior research analyst in Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached by E-mail at inquiry@gartner.com or by phone at (203) 316-1111.

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Briefs

■ **BMC Software, Inc.** last week announced plans to support more than a dozen additional databases, applications and middleware products via its **Patrol management software**.

BMC will roll out over the next year 16 new Knowledge Modules for its Patrol tool that support applications from SAP AG, PeopleSoft, Inc., Dun & Bradstreet Software, Inc., Lawson Software, Inc. and FileNet Corp. Patrol also will support Novell, Inc. and Transarc Corp. transaction monitors, plus several additional databases, including Microsoft Corp's SQL Server.

Patrol pricing starts at \$6,000, and Knowledge Modules begin at \$750.

BMC: (713) 918-8800.

■ **The Delrina Group of Symantec Corp.** in Cupertino, Calif., this week will announce **FormFlow 2.0**, an upgrade to its **electronic forms** software that lets end users identify the status and location of forms they originate. It also includes a new programming language called **FormBasic** for building forms-based applications.

In addition, the version includes a graphical tool, called **Graphical Routing Designer**, for designing workflow maps. A FormFlow developers' kit costs \$249, and a 10-user pack costs \$999.

Symantec: (800) 441-7234.

■ **Business@Web, Inc.** (formerly Object Power, Inc.) in Cambridge, Mass., has begun shipping **OpenScape**, a line of tools for building **Internet business applications**. The tool set is a visual point-and-click environment for creating and connecting component-based applications.

Prices range from \$145 for a single-user version to \$23,000 for the enterprise version. A free runtime version is available at the vendor's home page (<http://www.opower.com>).

Business@Web: (617) 376-0038.

Show preview

New messaging on tap at EMail World show

By Carol Sliwa

San Jose, Calif.

Next week's EMail World show here will serve as the launchpad for several new messaging offerings:

■ **SoftArc, Inc.** of Markham, Ontario, will announce **FirstClass 3.5**, an upgrade for its electronic mail, conferencing and groupware software package. The version incorporates tools for Web browsing, videoconferencing and using an electronic whiteboard. It also features a replication agent, called **FirstClass Personal**, for off-line work.

FirstClass 3.5, scheduled for release this summer, will cost \$495 for a five-user license and from \$35 to \$79 for additional users. Server upgrades are free for registered FirstClass server owners. Pricing for the replication agent has not been announced.

See Messaging, page 28

Vendors pump up ODBC middleware

Microsoft specification no longer being used just for simple database access products.

By Barb Cole

Microsoft Corp.'s Open Database Connectivity (ODBC) specification is evolving from a basic database access technology to the foundation for full-fledged middleware offerings.

The new middleware is typically server-based and eliminates

and other capabilities also are features of the new software products.

Since Microsoft first started pushing ODBC almost five years ago, it has gained a lot of market momentum, with most of the major database and application tool vendors supporting it.

Its popularity is expected to continue even as Microsoft introduces its OLE-DB standard later this year. OLE-DB will complement ODBC by providing connectivity between Windows application components.

Among the companies building ODBC-based middleware is Visigenic Software, Inc. Its upcoming ODBCNet software will require client machines to run only a single ODBC driver to

access an unlimited number of ODBC-compliant databases.

"One of the biggest problems companies have today is tracking and managing the multiple soft-

ware layers on their client machines," said Randy Hietter, director of product marketing at Visigenic, referring to the management challenge customers are presented with when they need to run multiple ODBC drivers on each client. As ODBC grows up, the database-specific elements get moved to the server on which the database resides, giving administrators a central point of management, he said.

ODBCNet's introduction is imminent, but Hietter declined to say when it will ship.

Other companies also are looking to support ODBC at the server level. Middleware veteran Information Builders, Inc. in December announced plans to license Visigenic's ODBC Driver Manager and release an Enterprise Data Access/SQL Unix gateway based on ODBC in the second quarter.

And Intersolv, Inc. has been developing Purveyor, a server-based ODBC middleware product, according to Ed Peters, vice president of data warehousing and data access solutions at the company. Intersolv's plan calls for pieces of Purveyor to be folded into SQLLink, server-based middleware acquired last year from Techgnosis, Inc. The new version will be rolled out later this year.

Meanwhile, Waltham, Mass.-based International Software Group, Ltd. is expected to release an ODBC-based middleware package dubbed Navigator around midyear. The software will include a query processor that returns results with minimal negative effect on the network. Navigator also is expected to include an object manager, which will provide connectivity between objects and support for Common Object Request Broker Architecture.

See ODBC, page 28

Microsoft's ODBC grows up

First-generation ODBC

- ▶ Client-based architecture
- ▶ Separate drivers required for each database
- ▶ Functionality limited to data access

Second-generation ODBC

- ▶ Server-based architecture
- ▶ Only one driver needed per client to access multiple databases
- ▶ Features such as security and the ability to do cross-database joins are provided along with data access

the need for each client to run a different ODBC driver for every database on the network. The ability to run database joins and faster queries, increased security

Company makes segue into distributed testing tools

By John Cox

Newton Centre, Mass.

Segue Software, Inc. last week released new and enhanced products for testing networked applications.

The offerings let developers run tests that can uncover problems in client-based graphical user interface applications, server-based application logic and database servers. The tests

can now run across TCP/IP and IPX nets in addition to the NET-BIOS networks already supported by Segue's tools.

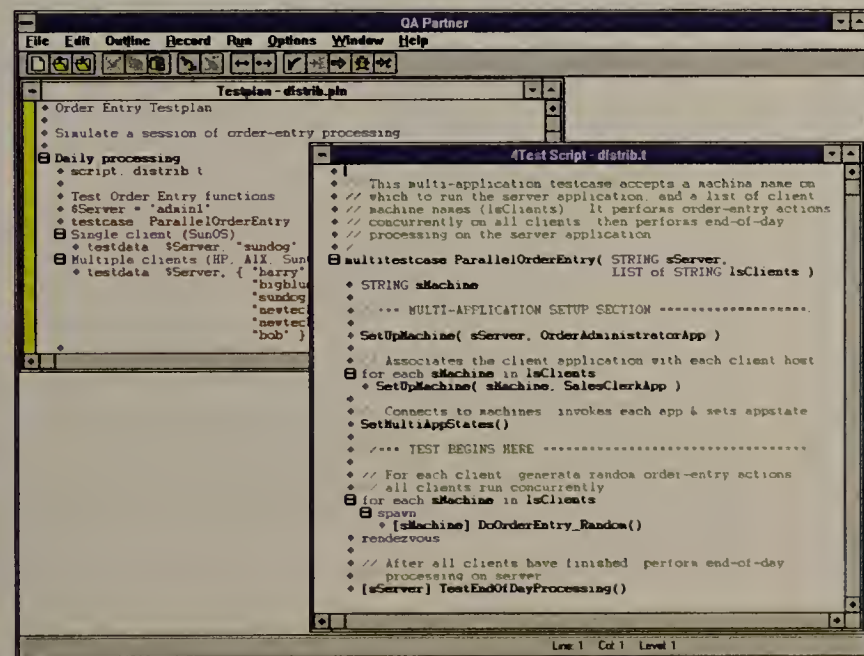
Segue's products go beyond many client/server application testing tools that are limited to checking only the client part of an application.

Segue's new offerings include **QA Partner: Distributed**, a revised version of the company's QA Partner, which is a set of applications for creating, running and analyzing automatic tests of software applications.

The basic structure is the same as the previous version: It generates test scripts in Segue's 4Test language, and the script works with Segue agents on each computer, where the application components reside.

The distributed version includes new 4Test commands to make it easier to build tests that run across networks. By supporting additional network proto-

See Segue, page 28



The software includes a Testplan module (upper window) that organizes a software test to run on clients and servers. Script is then linked to test agents, and test results are stored for analysis (lower window).

Download a guide to ODBC drivers on Network World Fusion (<http://www.nwfusion.com>).
Select News+ then Client/Server Applications.

ODBC

Continued from page 27

The move toward server-based middle-ware centered around ODBC is good news for users.

"It's good because you don't have to worry about as many different drivers or software providers," said Bob Moxham, technical architect at Bank of America in Concord, Calif. Moxham said the bank is evaluating ODBC middleware as well as a proprietary middleware offering from Sybase, Inc.

There was a time when an ODBC product wouldn't have been in the running, according to Moxham. "But with the market momentum and Microsoft behind it, it's attractive," he said. ■

Messaging

Continued from page 27

■ **Innosoft International, Inc.** of West Covina, Calif., will showcase PMDF-X500 for Digital Unix, directory services software based on the Open Systems Interconnection X.500 standard. With PMDF-X500, mail administrators will gain the ability to centralize their directory services.

End users will be able to search one centralized E-mail directory by alias or keyword, then automatically forward mail simply by clicking on an E-mail address entry.

The product also features a new Web hook that allows users to browse the X.500 directory tree from any HyperText Transfer Protocol-compatible Web browser and send mail from within the browser.

PMDf-X500 for Digital Unix, which will be available at the end of the first quarter, is priced at \$6,500 per server.

■ **CommTouch Software, Inc.** of San Mateo, Calif., will announce Pronto96 for Windows 95, a 32-bit version of the company's TCP/IP mail client. Pronto96 will be able to recognize URLs and File Transfer Protocol paths, and end users can launch Web browsers from within their E-mail clients. Users also will gain the ability to record and send voice messages as E-mail attachments.

The product, priced at \$69 per license, is scheduled to ship March 15.

■ **Campbell Services, Inc.** of Southfield, Mich., will announce that its OnTime Enterprise group scheduling software will be ported to Windows NT. The product, targeted for a second-quarter release, just entered its first round of beta testing.

The product will be priced the same as OnTime Enterprise for NetWare and VINES. The 10-user version will sell for \$994, and the 100-user version is priced at \$5,616.

■ Campbell Services: (800) 345-6747; CommTouch: (415) 578-6580; Innosoft: (818) 919-3600; SoftArc: (800) 763-8272.

COMMENTS?

See "How to reach us" on page 6.

Segue

Continued from page 27

cols, QA Partner:Distributed lets test scripts on Windows clients, for example, drive tests on a Unix server.

Another key enhancement to Segue's software is that it can use remote procedure calls and APIs to test server-based application logic, such as a C program for calculating mortgage interest.

"Today, there isn't a way to test these 'hidden objects,'" said Tim Perkins, Segue's vice president of marketing. "Our extension kit lets you get at any custom object or procedure, define these to QA Partner:Distributed and access it from our 4Test language."

Segue's other new offering, QA DBTester, gives developers direct SQL access to over 35 databases from 4Test via open database connectivity drivers. Segue

added verbs to 4Test so developers using QA DBTester can run a separate set of tests against the databases to verify that records were added or deleted correctly, among other things.

QA Partner:Distributed is available now and priced at \$4,995 for Windows and \$10,495 for Unix. Also available now, QA DBTester costs \$1,495 for Windows and \$3,495 for Unix.

& Segue: (617) 796-1000.



SHARED LOGIC

Mike Rothman

HP OpenMail: Dead or alive?

In this, my last "Shared Logic" column for *Network World*, I figured I should revisit my first and perhaps most controversial column. (Don't fret — I'm moving to the Web as a Network World Fusion columnist.)

For those of you who don't remember all my words of wisdom, here's a refresher

on my original "Ding, Dong! OpenMail's Dead" piece (NW, November 14, 1994, page 58).

It came in the wake of then-independent Lotus Development Corp. cutting a deal with Hewlett-Packard Co. to offer Notes through the professional services channel and to do some OpenMail/Notes

integration. At the time, I viewed the deal as a tacit acknowledgement on HP's part that it couldn't make it in the messaging business and eventually would cede everything to Lotus.

Yet, there were some unforeseen curveballs — namely IBM buying Lotus. That made me think HP would continue investing in OpenMail to maintain its presence within the messaging market. And, in fact, HP has.

As mentioned last week in NW (Feb. 12, page 10), HP executive Korak Mitra and the rest of the company's enterprise messaging operation are focusing on scalability, Web integration, competitive pricing, and enhancing the client with calendaring and groupware functions.

Unfortunately for HP, it faces a monumental uphill battle. Notes Release 4 is here, Microsoft Corp.'s Exchange Server is coming, and Novell, Inc.'s GroupWise XTD will also show up in 1996. Those high-profile products will offer much of the scalability and manageability that was OpenMail's hallmark. Do they scale to 10,000 end users per server? No, but who cares?

Does OpenMail have merits? Absolutely. It's still the most scalable and reliable platform out there — for mail. But my position is pretty clear: Mail and groupware will become integrated and folks making buying decisions today must take that into account.

So for existing OpenMail users, the client-side investments are good, but HP is playing major catch-up and it's too late to gain a leg up on the Big Three in this area.

That's not the niche HP should be going after anyway. There is a clear need for a scalable, reliable, secure application-to-application messaging infrastructure on which to build inter- and intra-enterprise commerce applications. And HP has a role to play here.

As mentioned above, OpenMail is a terrific technology for scalable messaging. With hooks the company is building into with some forthcoming business process software, you will be able to map business processes and workflow onto the OpenMail infrastructure, which can and should be extended to include trading partners, customers and other communities of interest.

Does the current OpenMail pricing model still make sense for this use? Nope. I'd expect HP to offer a new bundle that moves away from per-seat pricing and toward a heavy server model.

So is OpenMail dead? Yes and no. As a messaging/groupware platform, it won't go far. But as an application messaging engine there is lots of promise if HP can get the positioning, pricing and distribution right.

As always with HP, the real issue is whether the company will be able to transcend its historical incompetence in software marketing. And that one I'm not so sure about.

Rothman is a vice president in META Group's Global Networking Strategies service in Reston, Va. Feedback is welcome either by E-mail at MikeR@metagroup.com or by phone at (703) 860-6600.

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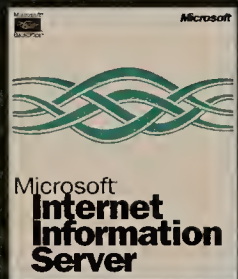
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NW-TS

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Electronic Commerce

Covering: Tools and Techniques for Interenterprise Networking
and Doing Business On-Line

Briefs

■ **CyberCash, Inc.** said *Rocket Science Games*, a maker of interactive entertainment software, will be the first company to make use of the CyberCash electronic wallet micropayments technology for electronic coins. *Rocket Science* will move its games to the Internet in the second half of 1996.

■ **TimeStep Corp.** has begun shipping a suite of security products that use the IETF's IPsec standard for encrypting TCP/IP communications between the Internet and corporate LANs or mobile computers.
TimeStep: (613) 599-3610.

■ **Allegheny Power Co. and Shenandoah Electronic Intelligence, Inc.** have completed work on a standard, called *Advanced Distribution Power Line Communication (ADPLC)*, that uses power lines rather than phone or cable to transmit data back and forth between electric utilities and their customers. ADPLC, sponsored and licensed by the *Electric Power Research Institute*, will also be used for meter reading and controlling lights in unoccupied businesses and homes.

■ **RSA Data Security, Inc.** has reached an agreement with **The People's Republic of China** to share RSA encryption technology for use on government networks and in credit card processing in China.

Based on a survey of 367 companies in the U.S. and Europe:

82% have Internet access.

96% of those without Internet access are planning to get it.

74% do not make Internet access available to all employees.

74% said the most prevalent use of the Internet is to transmit E-mail outside the company.

46% use the Internet in their marketing, advertising and public relations.

THE CONFERENCE BOARD, NEW YORK

Big business, government get behind FEDI

By Ellen Messmer

Big companies and big government are making headway into Financial Electronic Data Interchange, which requires banks to process payment requests.

In a grassroots effort in the agricultural chemical industry, distributors and suppliers helped by EDI-equipped Harris Bankcorp, Inc. last fall began paying one another electronically. However, it took over a year to set industry guidelines for how

electronic bank credits and debits would be handled through standard EDI formats such as the ANSI X12 820 payment order/remittance.

Chicago-based Harris Bankcorp wrote the required mainframe software and provided network support for a tailored version of the 820 transaction set called the Chemical Industry Data Exchange 820 format. Now manufacturers such as The Dow Chemical Co.'s DowElanco divi-

sion and Ciba-Geigy Corp. have begun settling payments electronically with distributors.

The benefits of FEDI include faster payments and less work for accounting departments, according to William Clemmons, manager of customer financial services at Indianapolis-based DowElanco.

Through FEDI, remittance advice and funds information move together between trading partners and the banking system. That data does not have to be put together manually when accounts are being reconciled, Clemmons said.

The farm industry organized the FEDI effort through the AgChem Alliance for Electronic Communications trade group, drafting a model trading partner agreement.

It includes references to technical standards and procedures, as well as financial matters. The agricultural and chemical industry agreed to make FEDI float-neutral to cover how interest that is accrued during the payment period is handled.

The industry's FEDI strategy also makes it possible for distributors that do not currently run FEDI mainframe applications to join the FEDI initiative, said Doug Rowley, a Harris Bankcorp vice president. United Suppliers is still limited to sending flat files over a value-added network to Harris Bankcorp, which does the conversion to the custom 820 format.

The government is also fighting for FEDI.

The Department of Defense's Dallas-based Army and Air Force Exchange Service (AAFES), which provides goods and services to military personnel worldwide, recently began processing payments through FEDI in cooperation with PNC Bank Corp.

Scott Wingfield, the FEDI manager for AAFES, said it took the military over a year to select a

Wal-Mart to lure electronic shoppers with Web retail store

By Peggy Watt

Bentonville, Ark.

This spring, Wal-Mart Stores, Inc. will open a store on the World-Wide Web, luring electronic shoppers with personalized sales promotions and sophisticated, three-dimensional merchandise displays designed by Microsoft Corp.

Wal-Mart's pilot program may offer the first glimpse of Microsoft's as yet unnamed merchant server, which runs with its recently released Internet Information Server on Windows NT. The on-line Wal-Mart will be created with Microsoft's version of Virtual Reality Modeling Language and feature the V-Chat animated icons used in the proprietary Microsoft Network.

Shoppers will be able to enter the electronic aisles with any Web browser, but they will need a shopping utility from Microsoft to gather and purchase merchandise, said Microsoft Chairman Bill Gates, who last week announced the project with Wal-Mart President David Glass.

Microsoft will build that utility into future versions of Windows and offer it free on-line when the Wal-Mart pilot begins. The site will contain such elements as an on-screen shopping basket and wallet to let on-line shoppers communicate with Microsoft's merchant server,

plus a purchasing command. Users will apply a personal key to encrypt payment information and seal their orders with a merchant key.

Wal-Mart will be one of the first on-line retailers to implement a new security technology called Secure Electronic Transactions, recently developed cooperatively by Microsoft, Visa International, Inc., Netscape Communications Corp. and MasterCard International, Inc.

Because users' shopping utilities are personalized by their keys, a retailer can use the ID to track each shopper's buying habits and target promotions to them. A retail service may keep user profiles to help personalize merchandising, Gates said.

Although Microsoft Consulting Services personnel are working with Wal-Mart staff to put the store on-line, Gates said the technology will be licensed to other retailers.

"We're a technology supplier. It's not a joint venture, and Microsoft is not in any form of retailing," Gates said. Microsoft will not receive transaction fees, only software licenses.

Wal-Mart expects to first offer a sample of its merchandise on-line, and then market the entire inventory of its Wal-Mart, Sam's Club and Supercenter outlets, which number nearly 3,000. ■



Wal-Mart President David Glass

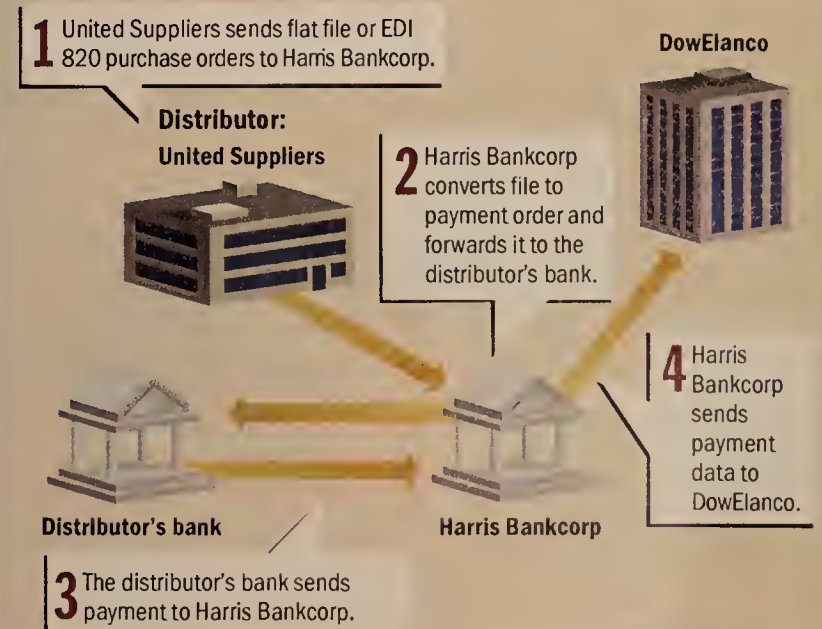


bank with a dedicated EDI staff and the most current investment in EDI technology.

"We wanted someone who could negotiate a float-neutral situation," Wingfield said. The AAFES handles three million invoices worth over \$5 billion annually, with 520 trading partners already sending 83,000 EDI invoices monthly.

Since last December, six of the EDI-equipped suppliers, including Proctor & Gamble, Inc., Levi Strauss & Co. and General Tire Co., have received payments electronically from the Defense Department through FEDI. ■

FEDI SPROUTS IN THE AGRICULTURAL CHEMICAL INDUSTRY



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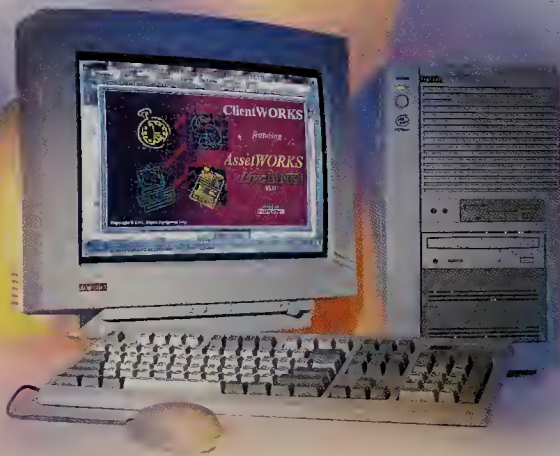
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Technology Update

Keeping Up with Network Technologies and Standards

NETWORK HELP DESK

Network World tracks down answers to your questions. Please submit them to Jim Brown via phone at (800) 622-1108, Ext. 408, the Internet at jbrown@nww.com or fax at (508) 820-1103.

Occasionally, readers write to us with questions or post queries on Network World Fusion's Help Desk forum but find the answers before we do. Here is an example:

Windows 95 to Unix print problem
Bob O'Hara, senior technical staffer at Advanced Micro Devices, Inc.'s I/O and Networks Division in Parsippany, N.J., told us he was having network printing problems when Microsoft Corp.'s Windows 95 clients using FTP Software, Inc. InterDrive 95 drivers sent files to a Unix-based PostScript printer spool. The printer spit out pages of PostScript code rather than an actual page. O'Hara isolated the problem to the network after he plugged his client directly into the printer and found everything worked fine.

As he looked into the problem, O'Hara thought that Microsoft improved its pscript.drv file to also send printer job language (PJM) code to printers.

Thus, the actual PostScript was sent over the network surrounded by PJM. Unfortunately, he says, this caused the spooler on the Unix host to identify the print job as a plain ASCII file rather than a PostScript file.

Every printer that is added to a Windows 95 client puts a unique file into the Windows system directory. In O'Hara's case, the file was called `ibm4039p.spd`, which he thought was a control file for pscript.drv as well as the customization of the properties dialog for the printer.

This file included several lines with PJM. Deleting those lines and restarting Windows 95 corrected his problem.

Here are the lines he deleted:

Protocols: PJM TBCP

JCLBegin: "<1B>%-12345X@PJL
JOB<0A>"

JCLToPSInterpreter: "@PJL ENTER
LANGUAGE = Postscript <0A>"

JCLEnd: "<1B>%-12345X@PJLE0J
<0A><1B>%-12345X"

New protocol mixes and matches services to create high-speed pipes

By Kevin Dickson

In order for the growth of Internet access, videoconferencing and collaborative computing applications to continue unabated, network managers must be able to ensure high-speed connections between different types of customer premises equipment.

A baseline for interoperability between disparate devices across a WAN already exists in PPP, a link-layer protocol developed by the Internet Engineering Task Force (IETF). A new

link settings, PPP negotiates the Network Control Protocols (NCP) required to establish the connection. NCPs, such as the IP Control Protocol and the IPX Control Protocol, specify network-layer requirements.

Over time, the original LCPs and NCPs have been modified and optimized to keep up with dynamic customer requirements. MP — IETF RFC 1717 — is one example of a newer protocol charged with meeting today's user needs. It works at the LCP levels.

valuable capacity when they can spread a traffic load across multiple links. This certainly is not a revolutionary idea in internet-working. However, most load-sharing implementations have been proprietary and based on packet-by-packet sharing techniques that suffer in certain environments.

When links have disparate path lengths, for instance, packets may arrive out of sequence at the receiving end. Certain Layer 3 protocols, like TCP/IP, are better than others at taking care of

Get more details on Multilink PPP on Network World Fusion (<http://www.nwffusion.com>). From the main menu, select NetRef, Technology Resources then WAN services.

NetworkWorld
Fusion

ate the maximum acceptable packet size. Vendors, until now, have handled fragmentation schemes on their own.

MP, with its ability to combine separate physical links of differing WAN services, can be a powerful tool for network designers and managers who want to maximize the efficiency of their services portfolio. For example, MP can be used to augment the bandwidth of a leased line with either single or multiple ISDN lines. This can give users a way to add capacity for multimedia applications, such as videoconferencing or collaborative white boards.

MP also solves several other problems associated with the delivery of greater bandwidth in PPP environments. However, challenges still lie ahead.

For example, the protocol does not define how and when bandwidth should be added to or removed from an MP bundle. A number of leading internetworking vendors, including Cisco Systems, Inc., have banded together to resolve this issue. The vendors have authored a new IETF draft PPP specification, called the Bandwidth Allocation Control Protocol, they hope will be standardized later this year.

Dickson is the ISDN product manager in the Internetwork Operating System software group at Cisco in San Jose, Calif. He can be reached by phone at (408) 526-4000 or via the Internet at kdickson@cisco.com.

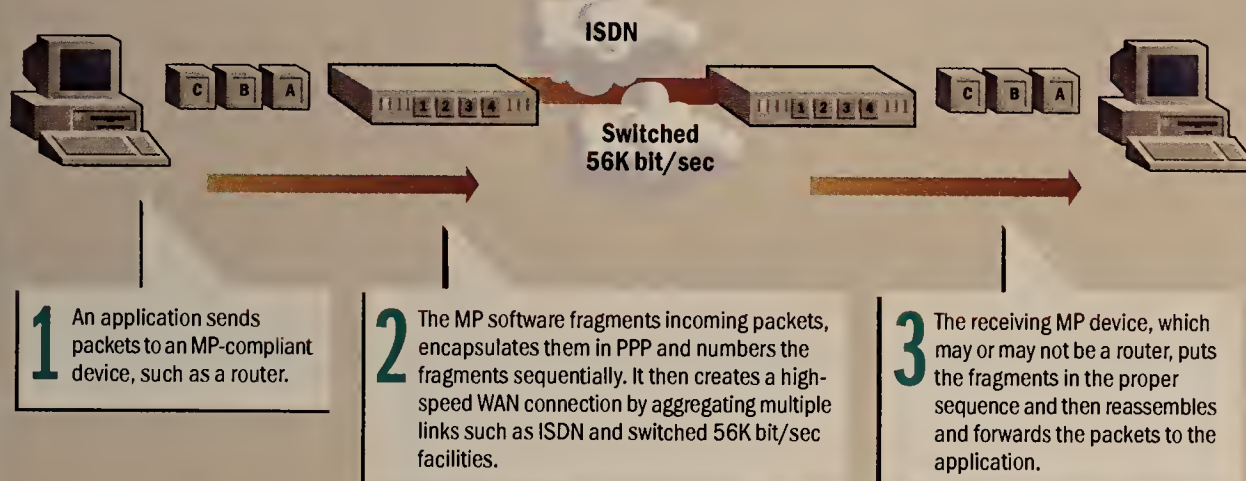
Need to learn about an important or emerging technology?

Let Network World provide a quick primer. Contact Beth Schultz by phone at (312) 283-0213 or via the Internet at bschultz@nww.com.

HOW IT WORKS

Pooling WAN bandwidth using multiple PPP

Multilink PPP (MP) creates a high-bandwidth path across the WAN by aggregating independent physical connections. It can combine links of any speed, mix a variety of services and provide interoperability between different types of customer premises equipment.



IETF specification, called Multilink PPP (MP), makes it possible to pool bandwidth from different services and establish high-speed connections between those interoperable devices.

PPP is actually a comprehensive group of protocols that collaborate to define the characteristics of a WAN connection between two or more network devices. The initial phase of a PPP session involves the Link Control Protocol (LCP), which negotiates the common settings and options used at the link level. These options include Link Quality Monitoring, authentication and maximum acceptable packet size.

After LCP successfully obtains

The inner workings

Keeping packet order is at the heart of PPP's design for simple point-to-point applications. But as bandwidth requirements for applications such as videoconferencing and file sharing grow, PPP is proving to be a limitation. MP attempts to rectify the problem by providing a way for internetworking devices to combine multiple PPP links and create a larger, virtual pipe.

MP functions independently of network-layer protocol and WAN service. It simply coordinates the operation of disparate physical links between two devices to produce a bundle of greater bandwidth.

Network managers can add

proper packet retransmission. But the optimal solution is a protocol, such as MP, that routinely handles sequencing.

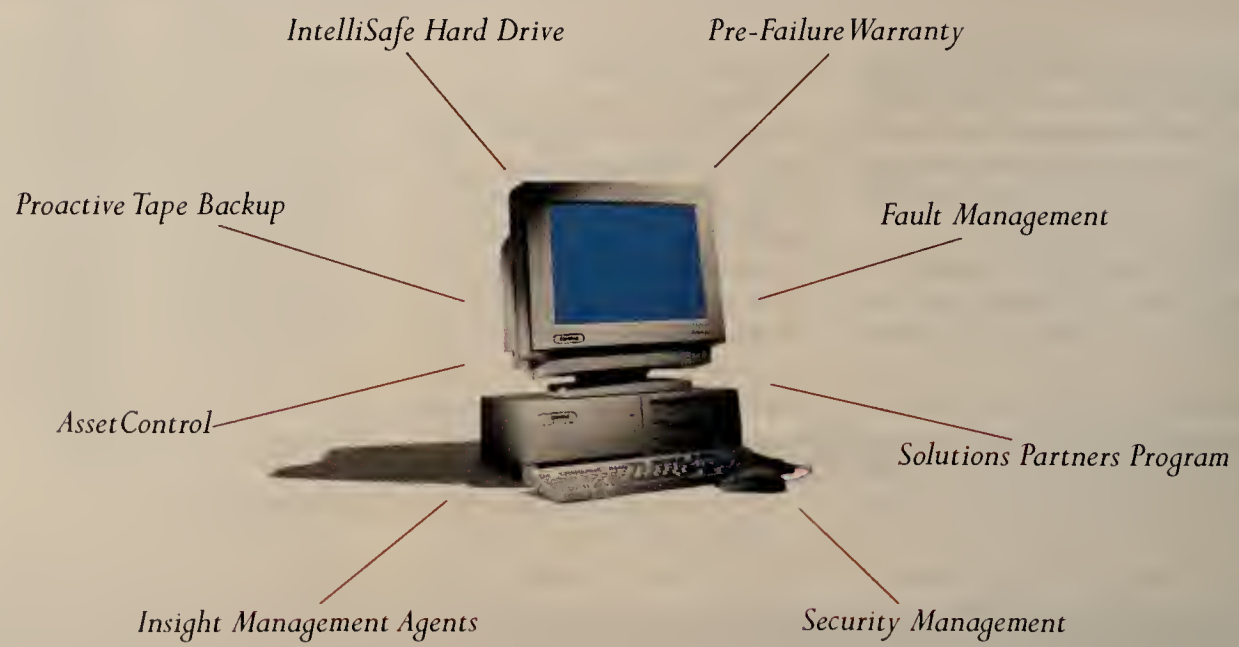
To resolve out-of-order packet problems, the MP software encapsulates the data in PPP and gives a sequence number to each datagram. At the receiving end, PPP uses this sequence number to recreate the original data-stream.

Data fragments

MP also makes it possible to fragment each packet to reduce transmission latency. For data fragmentation to occur, the devices must indicate the ability to receive and process fragmented packets and must negoti-

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EDITORIAL INSIGHTS

A delicate situation

The buzz over IBM's \$743 million buyout of Tivoli Systems, Inc. focuses on whether the computer maker can keep its hands off its new systems management savior. Almost in unison, third-party developers and even Tivoli's competitors agreed the deal will succeed only if IBM gives Tivoli free rein.

Some internal Tivoli folks are holding their breath. "Once they come up with the live-and-die decisions related to product overlap, we should have a good indicator if IBM intends to let us call the shots," one Tivoli employee said.

The wild card appears to be IBM's own people and processes. Consultants and former IBM employees raised the same issue: IBMers are conscious of their organizational rank and may resist the overtures of an outsider such as Tivoli CEO Frank Moss.

Moss will succeed only if he can infuse in IBM the same religious zeal that his own employees practice. And even if he succeeds, he still must address issues with developers.

One key area of product overlap in the IBM/Tivoli deal is software distribution tools. Former IBMer Ellis Gregory, now CEO of NetTech, Inc., a systems and network management developer in Raleigh, N.C., raises a valid point when he says IBM's NetView marketers will likely have to push Tivoli's software distribution facility. Should that happen, it would likely rankle a few feathers among developers in IBM's NetView Association who also sell software distribution tools.

IBM has a history of being open with developers in its NetView Association. Now IBM owns one of the biggest and most successful developers in Tivoli. When IBM reps begin to push Tivoli products, what's that going to do to IBM's relationships with other NetView Association members?

Then there's the issue of whether Moss and his executive team will survive for the long haul. If not, his idea of platform independence would likely go, too. That would leave IBM in a position of supporting systems management on its own platforms, with links to others where it deems necessary.

That certainly would fall well short of Tivoli's goal of being the Switzerland of systems management companies and would all but send a message that true, vendor-neutral systems and net management offerings are an elusive goal. But that wouldn't happen. Or would it?

Charles Bruno, enterprise editor

cbruno@nww.com

REALITY CHECK

ATM's new look: lower speed, lower price ... and higher usage?

Anyone who went to ComNet '96 last month and isn't infected with some sort of cerebral virus must have noticed the tremendous change in Asynchronous Transfer Mode positioning. Where we used to have a kind of ATM speed bidding war, with the biggest multiple of 155M bit/sec winning, we're now into cheap and easy. Why this is happening is interesting, and what might happen to the ATM marketplace as a result is even more interesting.

First, the show report.

ATM is getting slower at the carrier level. Five or more ATM vendors showed ATM interfaces at T-1 speeds and even lower for ATM carrier services. This only a couple of years after StrataCom, Inc. announced T-1 ATM and received a generally cynical response from the ATM pundits. Frame relay-to-ATM interworking was a feature of three major vendor and several carrier presentations. This is another way to get users who are interested in lower speeds and are thus more price-sensitive to consider ATM for at least part of their network.

Vendors are also getting interested in lower speed traffic as a source of ATM justification. Voice over ATM is probably the best example of this. Just a year ago, General DataComm, Inc.'s program for voice compression was greeted with considerable skepticism by analysts. Today, a voice compression standard is under development in the ATM Forum, and four vendors touted their voice capabilities at ComNet.

Then there was IBM's announcement of its 8285 ATM Workgroup Switch, which delivers ATM to the desktop at an astonishing \$495 per desk. Even more shocking is the fact that two other vendors claim they'll beat IBM's price within the year.

What's happening here is a reaction to the fact that most users issuing ATM requests for proposals indicated they weren't convinced multimedia — long touted as the *raison d'être* for ATM — had a clear application to their business needs. What will induce users to buy ATM if new multimedia applications won't? The only answer is lower costs. ATM has to become cheaper for firms to use than leased lines. To achieve that, vendors and carriers will be relentlessly pushing down ATM prices this year.

How relentlessly? We'll see T-3 ATM access base costs fall to about \$950 per month in some areas — \$130 per month less than the average T-1 line costs today. We'll see the price of 25M bit/sec ATM adapters fall below \$200 — an eighth of the average price they sold for just last summer. We'll see an entry-level ATM workgroup starter kit supporting eight workers with switch, ports and adapters, for less than \$3,500.

Low price is critical for the acceptance of carrier ATM because, as frame relay has shown, the best way to get users to try a new service is to make it at least 20% cheaper than what they're already employing. Deregulation of the local exchange market will drive down basic access prices sharply.



Thomas Nolle

That will make ATM more economical than leased lines in many applications.

As a result, carrier ATM services will begin to sell more strongly starting in 1997. Why not this year? Because users won't get the projects approved and executed fast enough.

Lowering prices at the customer premises equipment level is less certain to stimulate

demand. Today, desktop ATM has no demonstrable value. So making it cheaper may shift the focus of user discomfort from price to usefulness, but it won't completely eliminate resistance to desktop ATM.

What lower prices will do is increase the number of network points of purchase where ATM to the desktop could be used. With the typical cost of empowering the first dozen workers or so up in the \$50,000 range, only infrastructure buyers — or organizations funded by federal tax dollars — could experiment with ATM. But with the price cut by an order of magnitude, ATM will be within the reach of ordinary departmental buyers.

Enticing the departmental buyer may be critical to ATM's success. Ralph Ungermann, chief executive officer of First Virtual Corp., has long reported that the "application sell" of ATM-based video is most effective not with network planners, but with chief information officers, chief operating officers and end users. IBM seems to have the same view in mind with the 8285; a "workgroup kit" is obviously not intended to serve as the basis for an enterprisewide ATM commitment.

The short-term impact of both carrier service cost decreases and increases in the scope of ATM opportunity will stimulate the first real commercial ATM activity this year. In the long term, we may pay a price. Lower cost ATM tends to be tactical ATM, lacking any central policy control or planning guidance. A big company has more than 5,000 potential points of ATM purchasing, counting both carrier service connections and user workgroup experiments. Suppose all these people run rampant into ATM without any guidance or coordination? Can ATM be as effective an enterprise tool as we've expected it to be if everybody has their own subtle flavor of ATM technology?

Probably not. This year marks the death of enterprise ATM and the birth of project or tactical ATM. It's not as comfortable as the ATM we've gotten used to, but it's real. At the new, lower prices, ATM will fall in the range of project and workgroup buyers. End users who experimented with PCs in their youth can be ATM dabblers in middle age. The same kind of popularization of technology that spurred PC growth can be made to spur ATM growth. Network planners will have to figure out how to manage the explosion that could result.

Nolle is president of CIMI Corp., a technology assessment firm in Voorhees, N.J. He can be reached at (609) 753-0004 or via the Internet at tnolle@ix.netcom.com.

What will induce users to buy ATM if new multimedia applications will not? The only answer is lower costs.

Teletoons

By Phil Frank and Joe Troise
guru@well.com



Technonyms: Learn them at the buzzword institutes

As the 1996 trade show season kicks off, industry pseudoexperts hired as session speakers are attempting to create a new round of catchy buzzwords. Networking rookies and newcomers will likely be amazed and bedazzled by these technophrases.

I know I speak for many industry veterans when I say that we are tired of these all-out efforts to rename things and dream up phrases that become ill-defined and misused. Just when users become comfortable with names of products, functions and capabilities, some bonehead has to reinvent the wheel — not to improve or simplify matters, but just to leave his or her mark on the dynamics of the industry.

Maybe these so-called experts think inventing buzzwords shows superior intellect, signifying that they're technically up on industry trends. If that's the case, maybe I should create some buzzwords myself so that those who attend my conference appearances won't be disappointed.

Since combining words into sort of a shorthand expression, like modem or codec, is commonly accepted in this industry, how about a simpler term for robust solutions — say, "roblutions?" As in, roblutions in telephony are what all Fortune 500 CEOs are contemplating and striving for in their strategic plans.

How about "telegation" for a new buzzword? It's sort of a catchall for everything from computer telephony integration to telephone systems integration. As in, telegation is the cornerstone of every successful information technology endeavor.

What about a buzzword for the impact of legal and regulatory issues on technology? Maybe something like "legregology." As in, Washington, D.C. is the mecca for people interested in debating legregology.

What about "vipression" as engineering shorthand for video compression? As in, new vipression techniques are needed for full-motion video. Or why don't we make it "vipressioniques," since we're all so advanced in technoshorthand?

Global telephony is very important for most organizations, and I



James Carlini

know from firsthand experience that companies are looking for experts in this area. But the buzzword "globalphony" just doesn't have a credible ring to it. To say to someone that you are an expert in globalphony just does not give a good first impression — although it does fit some trade-show speakers to a tee.

Hey, this renaming and inventing words is easy. We need more jargon and acronyms to justify our high-paying jobs. Forget about making networking terms simpler so people can catch on to the

concepts more quickly and thus more easily adapt to the ever-accelerating rate of technology.

Or should we begin to view the market a little more wisely and develop terms that people can easily identify and understand?

For example, wouldn't it be better if ISDN Basic Rate Interface service, also known as 2B+D, were called Two-for-One service and priced that way? "Buy this new network service and get two digital lines for the price of your old analog line." What a pitch!

By using a more straightforward name, the phone companies could have made up any revenue differences in usage charges and still have been years ahead of where they are today in ISDN BRI sales and implementation. Instead, they opted for the 2B+D moniker and a 1.2X to 1.3X pricing scheme that confused everyone. And these people want to market cable TV and enhanced services?

Let's face it, they practice Same-old Crummy, Usually Dumb (SCUD) marketing. Like the missiles they're named for, SCUD marketing approaches start off with a big bang but are off the mark and usually miss their target by a wide margin.

Well, what do I know — I'm not a "proctoterraquiziologist." What's that? Someone who doesn't know a basic part of his or her anatomy from a hole in the ground — which is usually the type of person making up all of this buzzword nonsense.

Carlini is president of Carlini & Associates, Inc., an international management consulting firm in Hinsdale, Ill. He can be reached at (708) 986-1888 or via the Internet at carlini@nwu.edu.



IN-BOX

The flame game

Our editorial "Ouch, ouch, ouch" (Jan. 29, page 48) elicited a large response from readers eager to share their thoughts on the whys and wherefores of flaming. Following is a representative sampling of views. You can find the full text of these letters, as well as others we couldn't fit on this page, on *Network World Fusion*.

I enjoyed your editorial a great deal. I think there are two issues involved:

First, people do use the anonymity and solitude of electronic mail to let out their venom. It's always been easier to write a dirty word than say it.

Second, at times, the computer press really does rub people the wrong way. Articles are frequently written like editorials

and take some stance, as opposed to weighing both sides of the issues they raise.

Perhaps obnoxious E-mail is a symptom of frustrated readership that feels it is not being heard.

Just as in radio, where the politically conservative talk shows discovered volumes of people who were frustrated with the liberal tendencies of the mainstream media, you may be finding out that there is a frustration with the computer press for tending to be pro whatever.

*Christopher Rosien
Computer systems manager
Robert Englekirk Structural Engineers, Inc.
Los Angeles*

People seem all too eager to spew forth their cynicism across the faceless span of the Internet. Reactive word processing without reflective thought processing is the culprit.

It's very easy to blast a flame, turn off the computer and go to bed without another thought about the human receiving

the flame. Esprit de corps hasn't developed on the Internet yet. I think it would be a good idea to have classes in school that help students develop E-mail skills at an early age.

*Harley Schoville
Milwaukee*

"Why do people feel comfortable adopting this cyberhostility — one they might never exhibit in face-to-face dealings?" It's due to a combination of anonymity and convenience.

It's way too easy for people to be jerks online because they are anonymous, and the chance of getting punched in the nose due to their rudeness is slim.

Most people don't write a rude letter because it takes too much time to start their word processor, type the letter, print it out, address the envelope, buy a stamp and go to the post office. By the time they do all these things, they have cooled off.

*Gavin McCollam
Bismarck, N.D.*

Read more letters about our editorial on flaming, and add your own thoughts, on *Network World Fusion*. Select Forum, Editorial Insights, then Topic 4- Ouch, ouch, ouch.

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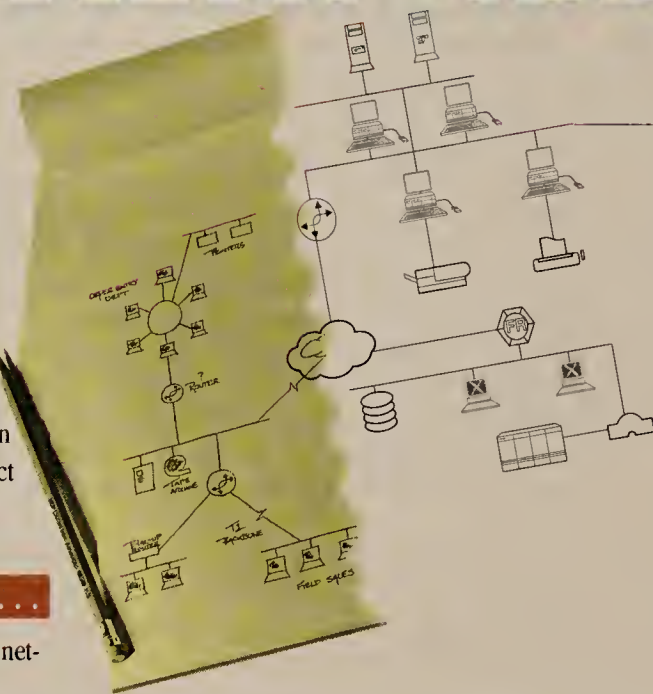
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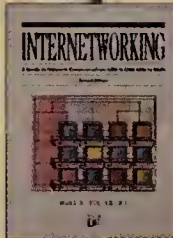
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- Analyze repeaters, bridges, switches, routers and gateways to determine which one is appropriate for particular applications
- Prepare for the next generation of internetworking challenges: Frame relay/SMDS, frame relay/ATM and SMDS/ATM connections
- Understand key internetworking protocols, such as TCP/IP, IPX/SPX, X.25 and XNS
- Determine bandwidth requirements for both leased line and broadband circuits utilizing traffic studies



- Troubleshoot your environment through case studies that detail protocol operation, and illustrate typical internetworking problems and solutions, including Ethernet fragments, the token ring route discovery process, and FDDI station management
- Understand the key internetworking features of AppleTalk, Banyan VINES, NetWare, OS/2 LAN Server and Windows NT
- Discover some key applications for narrowband ISDN technology
- Compare the technologies and operation of ATM, frame relay and SMDS, and discover the role of the broadband implementers: the Frame Relay Forum, the ATM Forum and the SMDS Interest Group
- Understand the detailed operation of Ethernet, IEEE 802.3, token ring and FDDI, and key performance characteristics of these technologies
- Evaluate the differences between Transparent Bridging, Source Routing and Source Routing Transparent Bridging internetworking standards
- Utilize available software tools in the network optimization and modeling process
- Examine application gateways that connect LANs, minicomputers and legacy systems
- See how SNMP plays a key role in internetwork management including the management and operation of broadband networks
- Understand the operation of IP-based routing
- Match the appropriate LAN application with the WAN broadband technology
- Understand TCP/IP and the Internet protocol suite, including ARP, ICMP, UDP, SMTP, TELNET and FTP
- Explore the internetworking challenges of remote access and wireless communications

1996 LOCATIONS AND DATES

Irvine, CA	January 17-18	Washington, DC	April 23-24
Dallas, TX	February 12-13	Chicago, IL	May 7-8
New York, NY	February 27-28	Boston, MA	May 14-15
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Network World's

CAPITALIZING ON THE INTERNET

a supplement



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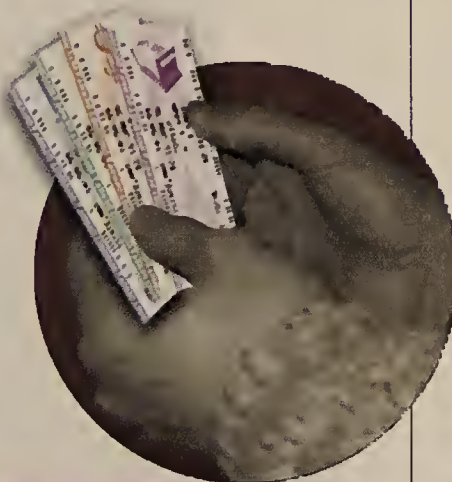
Official Access Provider to The Microsoft Network

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It's post time at the great Internet Derby, and the vendors are at the starting gate. As you craft your electronic commerce strategy, which companies should you be gambling on for your Internet software infrastructure?



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Cover photo illustration by Betsy Hayes. Cover photo: The Bettmann Archive.

FROM THE EDITOR

Here's the great irony of the Internet Age: At a time when new life forms bloom riotous in the primordial ooze of the 'Net marketplace and the dominant species of the current computing epoch frantically try to reengineer their genetic codebases to survive the harsh new conditions on the planet, you are somehow supposed to predict which of these new and extant organisms will survive the brutal Darwinian battering to come – to choose which of the toothed, clawed, winged or furless contenders will rule the Internet jungle once the continents have separated and the choking dust cloud of hyperbole has cleared.

Whew. Some analogy, huh?

To put it plainly, you have to bring your business on-line today, and, in doing so, you have to pick the products and vendor partners that are going to last.

As with every other sea change in computing, you're forced to make decisions before all the stan-

dards are settled, before the key technologies have hit puberty – let alone matured – and before the corporate mating rituals have all wound down. You are the point person in this electronic commerce effort and you don't have the luxury of waiting out the inevitable and unsettling changes ahead. This is the evolution of a whole new industry, baby (Stephen Hawking meets Dick Vitale?), and you're square in the middle of it.

Because you have to choose now, we've devoted a big chunk of this issue to handicapping the Internet software race – in essence, making odds on which companies will dominate key markets like browsers and server software, as well as commerce and security tools. Our goal is to make it a bit easier for you to bet the boss' money wisely down at the Internet racetrack.

Good luck.

– John Gallant, editor-in-chief jgallant@nww.com

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Off to the



HANDICAPPING THE INTERNET: WHO'S GOT THE BEST ODDS TO DOMINATE KEY INTERNET SOFTWARE MARKETS?

What do the Internet and the Kentucky Derby have in common?

Well, in either case, it's possible to reap a big return on a small investment. All you have to do is back the right horse.

True, walking up to the \$2 window at the track is much simpler than betting on the Internet. Unlike at Churchill Downs, nobody knows for sure yet where the Internet racetrack leads. Or how big the purse is. Or how many winners there may be.

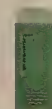
The Internet sweepstakes is shaping up to be a complex affair, with lots of contestants vying for the lead in numerous market niches.

In a few cases — such as with Internet service providers (ISP) — the market has taken on semisolid form. The major ISPs are readily identifiable, and leaders — such as PSI International, UUNET Technologies, Inc. and NetCom On-Line Communication Services, Inc. — are emerging.

But even the ISP marketplace is likely to undergo massive upheavals in the months and



Internet
access software



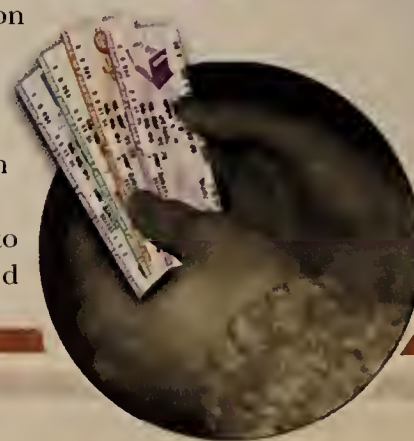
Internet
server software



Internet commerce
and security



Internet search
technologies



haces

by Edwin Mier



years ahead. With potentially huge dollar volumes at stake, on-line service providers such as CompuServe, Inc. and America Online, Inc. are fiercely counter-attacking. And powerful cable-TV consortia, as well as local and long-distance telephone carriers, are waiting to enter the fray.

Internet Software

Internet access is one mushrooming business opportunity. But how about actually conducting business over the Internet? That's a whole different marketplace — one that's being driven by software.

A quick scan of the press reveals that the number of vendors with software offerings developed specifically for the emerging Internet market-

place is exploding, with well over a hundred already. The players

range from traditional industry powerhouses — such as IBM, with its newly acquired Lotus Development Corp. business unit — to start-ups that are entering this market on what seems to be a daily basis.

Sorting out all the new software products is a little like trying to describe a passing bullet train. Still, much of the software activity and development can be discussed in the context of four general areas. It's in these areas that you'll have to make strategic purchase choices, gambling on which vendors will dominate the Internet and which will be also-rans:

- Software for client access to the Internet. Much of this software, including browsers and viewers, loads and runs directly on users' workstations. In some cases, though, depending on the network environment, users may share access to the Internet through a node running special gateway software.
- Internet server software, including packages that let you set up and run

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your own Web server sites. Related applications include Web-page authoring tools and utilities that let you convert data to and from Internet formats.

- Internet commerce and security software, for controlling such tasks as monetary transactions, firewall insulation and virus checking.
- Special search software, developed to help users find specific nodes or data files residing on the mushrooming number of Internet server sites. With names like "spiders" and "crawlers," this software has been running on dedicated servers within the Internet — the so-called search engines. But the search tools are now being licensed to software vendors for incorporation into packages that run on user nodes such as database servers.

Trying to pick the winners in the four key Internet software markets is tough sledding at this stage. But to give you some insights as you go on your Internet shopping spree, here's an early handicapper's report.



Internet access software

In the area of client access to the Internet, one particular application has already become a ubiquitous commodity: the Web browser. And the clear leaders in the browser market are Netscape Communications Corp., the National Center for Supercomputing Applications (NCSA) and Spyglass, Inc.

But today's leading providers of Internet browser software won't necessarily be tomorrow's. Indeed, what was initially the most popular Web browser software, NCSA's Mosaic, has since been overtaken by Netscape's enormously popular browser software.

Netscape is one of the Internet overnight-success stories. Indeed, it serves as the example that other start-up software vendors hope to emulate. A little more than a year old, Netscape went from obscurity to a market valuation of some \$2 billion after it went public last year.

Besides Netscape, at least a dozen other vendors now offer Web browsers. Prominent among them is Microsoft Corp., which offers its Internet Explorer browser as part of an inexpensive software option with Windows 95. It's also available free by downloading it from Microsoft's Internet site.

Another major browser player is Spyglass. But rather than compete directly with the others, Spyglass licenses its browser, based on NCSA Mosaic, to other vendors, who integrate it as part of their own client software packages. Several dozen third-party vendors are now among the Spyglass licensees, including, for example, FTP Software, Inc. and Oracle Corp.

The fact that Spyglass sells through OEMs means it gives up end user market control - its product is available in a constellation of custom implementations without a consistent identity.

Other players worth watching in the browser marketplace include IBM, Novell, Inc. and Attachmate Corp., which recently purchased the Wollongong Group, Inc. and its Emissary browser.

Browsers clearly represent the flashier side of Internet client software, but more is required for "full" Internet access and interaction. Users also need client software for a plethora of older Internet protocols, developed for specific applications such as exchanging E-mail, file transfers and newsgroups.

The challenge in the browser software marketplace is to integrate support

for this broad array of Internet protocols and to provide integrated extensions for some still-unsettled aspects of Internet activity — like security and multimedia data.

A few browsers, including Microsoft's and Netscape's, and other new software packages, such as Emissary, are close to delivering such comprehensive, multiapplication support in a single client software product.

If you think your company needs to standardize on a browser, you might want to put off a commitment until the market settles down in the third and fourth quarters of 1996. For now, at least, browsers are too immature for you to make a safe, large-scale adoption of a single product.



Internet server software

Almost any computer with a network interface can be made into a Internet Web server. Indeed, the home pages users see while surfing the 'Net are hosted by Web servers running on a diversity of systems — ranging from Windows PCs to Macintoshes to Unix workstations.

Internet access software			
	WIN	PLACE	SHOW
RACE 1	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>
MAKE SELECTION BY PROGRAM ITEM			
	JOCKEY	ODDS	
	IBM/Lotus Weight class* (\$): AA	LOU GERSTNER 20:1	
	Microsoft Weight class (\$): B	BILL GATES 4:1	
	NCSA Weight class (\$): Maiden	LARRY SMARR 10:1	
	Netscape Weight class (\$): Maiden	JIM CLARK 1:1	
	Novell Weight class (\$): C	BOB FRANKENBERG 20:1	
	Spyglass Weight class (\$): Maiden	DOUG COLBETH 3:1	
Others	Check latest scratch list and odds before placing bets		

Internet server software			
	WIN	PLACE	SHOW
RACE 2	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>
MAKE SELECTION BY PROGRAM ITEM			
	IBM/Lotus Weight class (\$): AA	LOU GERSTNER 5:1	
	Microsoft Weight class (\$): B	BILL GATES 3:1	
	Netscape Weight class (\$): Maiden	JIM CLARK 1:1	
	Novell Weight class (\$): C	BOB FRANKENBERG 20:1	
	Sun Microsystems Weight class (\$): B	SCOTT MCNEALY 4:1	
Others	Check latest scratch list and odds before placing bets		

* Weight class based on revenue: **AA**: \$50 billion and over, **A**: \$10 billion - \$50 billion, **B**: \$5 billion - \$10 billion, **C**: \$1 billion - \$5 billion, **Maiden**: Under \$1 billion, start-ups

A special server application is required for a computer to become a Web site. This software ensures that the information screens Web surfers see are consistent. That's made possible by the standardized HTML language used to create Web pages and the HTTP protocol used by Web servers to communicate them to Web browsers.

The leader in the commercial server market niche is Netscape and there's a strong likelihood Netscape will retain its early lead for the foreseeable future.

Why? Major new Web server hardware and software packages recently announced by Digital Equipment Corp., Hewlett-Packard Co. and Silicon Graphics, Inc. all incorporate Netscape's server software. And unlike a lot of new software entrants, whose packages run in one particular operating environ-

ment, Netscape offers its Web server software for a range of platforms.

Aside from Netscape, several widely deployed Web server applications are freely available to users via the 'Net. And while these packages are not as sophisticated or easy to use as Netscape's, they do run the majority of Web sites today. These include HTTP servers from NCSA, CERN (a physics laboratory in Europe), the European Microsoft Windows NT Academic Centre (EMWAC) and the Apache HTTP Server Project.

But there are two other key players to watch in the commercial Web server software marketplace: Microsoft and IBM/Lotus.

IBM offers Web server software that runs on its mainframes under MVS. But it must now reconcile that product direction with the InterNotes package offered by Lotus, which also contains a Web server capability.

Clearly, the Lotus package is better suited to the low- to mid-range Web server environment. However, as performance of Web sites becomes more of an issue, a mainframe-based Web site may appeal to some users.

Having a solid foothold in the Web-server software marketplace will be key to future success in selling distributed and client/server applications. Since this is IBM's strong suit and clearly one of Big Blue's strategic priorities, IBM must achieve such a foothold — at great cost, if need be. And if its own in-house-developed software, or Lotus', doesn't make it, IBM still has enough capital and clout to buy its way into Web server software prominence.

A number of software vendors already offer full-feature Web server software for Windows NT, typically with price tags of less than \$500. Early leaders in this Web-server software niche include Process Software Corp. of Framingham, Mass., and O'Reilly & Associates of Sebastopol, Calif.

Microsoft, while late entering the Web server software fray, appears intent on dominating at least the Windows NT portion of the server market. A few weeks ago, the company began shipping its Internet Information Server. Price tag? Same as its browser, it's free. Asked how the company can make money by giving away its Web browser and server software, a Microsoft spokesperson said: "You've still got to buy Windows 95 and NT."

As the number of vendors with competing Web server applications for Windows continues to grow, prices will certainly begin a downward spiral.






Don't count Novell out of this race, either. The company is clearly hot on the Internet and may play a spoiler role here with its NetWare Web Server offering. The company's large installed base gives it a great opportunity but certainly no guarantee of success in this topsy-turvy market.








As with Web browsers, you should look for software vendors that will be able to integrate Web server applications with other, related features — including HTML authoring tools, data import/export converters and relational database management systems. They'll be moving ahead most quickly in this increasingly competitive market sector.

Indeed, Netscape reportedly plans to integrate Informix Software, Inc.'s relational DBMS into a future version of its Web server software.

What's more, most application software vendors are looking to hook their existing wares into Web server applications. And it's for this reason that Web-oriented application development tools and interfaces — such as Sun Microsystems, Inc.'s Java, the first to achieve nearly universal acceptance — have become all the rage.

But whether Java alone can propel Sun to the forefront of the Internet software race, or whether it even represents a significant source of revenue, remains to be seen.

Internet commerce & security			
RACE	WIN	PLACE	SHOW
3			
MAKE SELECTION BY PROGRAM ITEM			
	JOCKEY	ODDS	
	WILLIAM MELTON	3:1	Cybercash Weight class (\$): Maiden
	DAVID CHAUM	8:1	DigiCash Weight class (\$): Maiden
	JIM BIDZOS	2:1	RSA Data Security Weight class (\$): Maiden
	KERMIT ESEKE	5:1	Secure Computing Weight class (\$): Maiden
	STEVE WALKER	5:1	Trusted Information Systems Weight class (\$): Maiden
Others	Check latest scratch list and odds before placing bets		

Internet search technologies			
RACE	WIN	PLACE	SHOW
4			
MAKE SELECTION BY PROGRAM ITEM			
	JOCKEY	ODDS	
	BOB PALMER	7:1	Digital Equipment Corp Weight class (\$): A
	PRAKASH AMBEGAONKAR	5:1	Frontier Technologies Weight class (\$): Maiden
	ROBIN JOHNSON	6:1	Infoseek Weight class (\$): Maiden
	LOU GERSTNER	7:1	IBM/Lotus Weight class (\$): AA
	ROBERT DAVIS	3:1	Lycos Weight class (\$): Maiden
	BILL GATES	10:1	Microsoft Weight class (\$): B
	TIM KOOGLER	3:1	Yahoo! Weight class (\$): Maiden
Others	Check latest scratch list and odds before placing bets		

Microsoft is likely to counter with its own Windows-based alternative, although pieces of Microsoft's current software development repertoire — Visual Basic, C++ and OLE — can collectively be viewed as a direct competitor to Java.

For now, though, almost all browser vendors have dutifully announced plans to add Java support to their browser software.

It is not clear if a viable market for Web-page authoring tools and related applications, such as data import/export tools for Web formats, will last very long. That's because most leading word-processing vendors are quickly adding these capabilities to their document-processing packages.

And converters for reformatting data to and from the HTML format are already being added by most leading vendors of spreadsheets, database management systems and so on.



Internet commerce and security

Until standards for Internet security and authentication solidify, it's open season for software innovators to devise secure ways to make payments electronically via the 'Net.

One of the most prominent is CyberCash, Inc. of Reston, Va. The company's major strength is that it is already operating an electronic credit card payment system called Secured Internet Payment Services.

Another vendor, DigiCash, Inc. of Palo Alto, Calif., is working to implement the digital equivalent to cash for exchange over the Internet.

The key to success in this milieu is to establish a broad installed base of actual users before different and possibly incompatible Internet standards are formally adopted and deployed. A working system with an installed base is something the Internet standards-setting bodies understand and respect.

RSA Data Security, Inc. of Redwood City, Calif., stands to gain if either CyberCash or DigiCash succeed. Both firms employ security mechanisms licensed from RSA Data Security in their software and services, and so do many other vendors looking to build efficient and effective security features into their packages.

The ability to securely buy and pay for merchandise, and otherwise move

money — or its electronic equivalent — is key to widespread Internet commerce. This environment is still too new for anyone to say with certainty who the winners will be, or whether the ultimate electronic money movers and shakers have yet appeared on the Internet scene.

Still, CyberCash was early to market and has built both a working system and a reputation. And while RSA Data Security tends to maintain a low profile, it is more often than not involved as the technology supplier for security and authentication features.

Another aspect of Internet security, which has already materialized as a thriving business, is firewalls. A firewall is a special software package that insulates private networks from unauthorized access from the Internet.

About 10 vendors currently split this unique market niche and none has more than about a 15% share.

Even so, a few have established themselves as solid leaders. They include: Trusted Information Systems, Inc. (TIS) of Glenwood, Md., which offers the Gauntlet firewall package; Secure Computing Corp. of Roseville, Minn., with its Sidewinder firewall; and ANS, with its InterLock firewall.

TIS is a low-priced leader. Its firewall software runs on Pentium PC platforms, although the software package employs a proprietary, Unix-based operating system.

Many other firewalls run on and require higher-cost Unix systems, such as Sun SPARCstations or IBM RISC System/6000s. And their package prices (hardware and software) typically exceed \$30,000.

Some other firewall vendors, with established and growing installed bases, also could still emerge as leaders in this market. They include IBM, with its RS/6000-based NetSP, and Milkyway Networks Corp., a small company that offers the Sun-based BlackHole firewall.

Effective distribution and support channels could be more important to firewall success than actual software features. This is where TIS and ANS have the edge.

TIS is distributed and serviced by UUNET, and many of the new corporate accounts that sign on with UUNET — a leading ISP — also sign on for a TIS firewall. ANS is a leading ISP, and so its firewall software has a near-captive market.



Internet search technologies

Another new technology area spawned by the Internet is search software. A handful of publicly accessible Internet nodes, called search engines, let Web surfers configure and launch sophisticated searches of Web sites, looking for a particular site or a particular subject.

Not much has been spent by end users on this emerging software technology — at least not yet. But several prominent vendors are positioning themselves to supply search technology and services when the demand justifies charging a fee.

Both IBM, with a not-very-intuitive-to-use search site and system called InfoMarket, and Digital, with its Alta Vista site, plan over the next few months to begin charging surfers who employ their search engines. Both sites have been readily accessible for free.

Other notable, “public” search sites and facilities operating on the ‘Net include Yahoo! and Lycos. Both are run by commercial firms, which are looking more to advertising as their main source of revenue.

The Lycos search engine was developed by Carnegie Mellon University. And while current plans are for the Lycos search site to remain free to Web surfers, the Lycos search software technology is now being licensed to third parties.

One such licensee is Frontier Technologies in Mequon, Wis., which distributes the Lycos search software on a CD-ROM, along with a voluminous database of Web sites, as part of a subscription service.

Subscribers perform their own searches off-line any time they desire, and then use the results of the search for more efficient surfing once they

connect to the ‘Net. The Web site database used by the search engine software is updated and distributed to users monthly by Frontier on CD-ROM.

Another notable Internet search technology vendor is Infoseek Corp.

PAST PERFORMANCE AND NOTES

CYBERCASH, INC.

Stable: Reston, Va.

- ✦ Lots of money riding on this horse
- ✦ Has credit card payment system already running on ‘Net
- ✦ Efforts to grow solid user base could be complicated if different security/payment standards are adopted

FRONTIER TECHNOLOGIES CORP.

Stable: Mequon, Wisc.

- ✦ Horse of a different color: Can it convince users to buy a monthly CD-ROM for off-line searches?
- ✦ Longtime ‘Net player
- ✦ Licenses Lycos search engine

IBM/LOTUS

Stables: Armonk, N.Y./Cambridge, Mass.

- ✦ Carrying excess weight: How will IBM and Lotus product overlap be resolved?
- ✦ Notes provides added muscle
- ✦ Does IBM have a real Internet plan?
- ✦ Will surfers pay for IBM InfoMarket searches?

LYCOS, INC.

Stable: Marlborough, Mass.

- ✦ A leading search-engine technology
- ✦ Doesn't seem there's a sound business plan in place

MICROSOFT CORP.

Stable: Redmond, Wash.

- ✦ Stumbled out of the starting gate but makes up ground fast
- ✦ Has a decent browser
- ✦ Will it counter Sun's Java?
- ✦ How will its Web server stack up?

NATIONAL CENTER FOR SUPERCOMPUTING APPLICATIONS (NCSA)

Stable: Champaign, Ill.

- ✦ Strong starter but may fade toward finish.
- ✦ Mosaic browser is offered free to users, licensed to resellers
- ✦ Software is aging, hasn't kept up with competition

NETSCAPE COMMUNICATIONS CORP.

Stable: Mountain View, Calif.

- ✦ Early leader going into first turn
- ✦ Can it continue to dominate servers, browsers, et al.?
- ✦ Big money riding on this horse
- ✦ Partnerships add plenty of muscle

NOVELL, INC.

Stable: Provo, Utah

- ✦ A little late getting to the Internet starting gate
- ✦ Has made plenty of changes of late, will it stay the Internet course?
- ✦ How will NetWare Directory Services play on ‘Net?

SPYGLASS, INC.

Stable: Naperville, Ill.

- ✦ Jockeying hard for position through partners
- ✦ Mainly licenses its browser software to VARs
- ✦ Can it keep up with Netscape?

SUN MICROSYSTEMS, INC.

Stable: Mountain View, Calif.

- ✦ A spirited steed, but can it stay on track?
- ✦ Java partnerships put a shine on its coat, but can it make much money from Java licenses?
- ✦ Will Sun exploit Java with its own new Internet software applications?
- ✦ Strong position in server hardware

TRUSTED INFORMATION SYSTEMS, INC.

Stable: Glenwood, Md.

- ✦ A safe bet, sure to place
- ✦ Firewall runs on Pentiums but with proprietary OS
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YAHOO! CORP.

Stable: Mountain View, Calif.

- ✦ Must keep up fast pace in its first race
- ✦ Well known but may be falling behind technologically
- ✦ How will its search site fare against pay-per-search competitors?

of Santa Clara, Calif. Users of Netscape's browser are automatically directed to Infoseek's Web site if they push a “search” button.

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Mier is president of Mier Communications, Inc., a Princeton, N.J.-based network consultancy that specializes in customized protocol analysis and planning.

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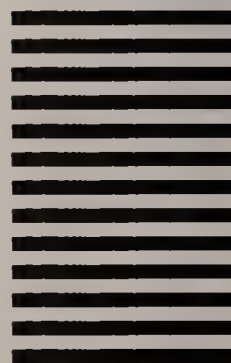


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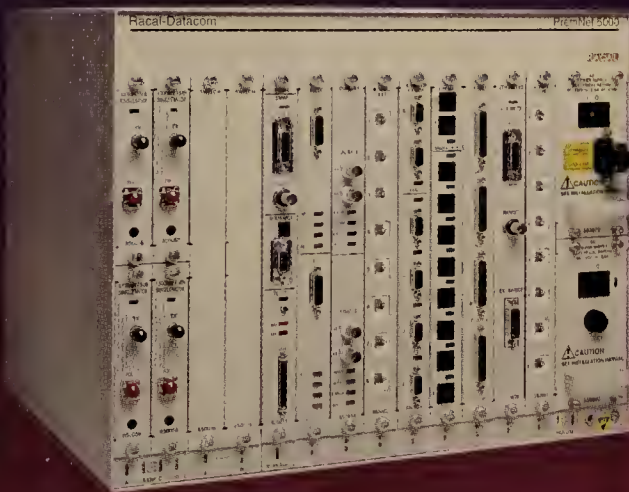


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Circle Reader Service #30

RACAL

Communicating through technology

Microsoft Corp. has delivered a solid Web browser for Windows 95. But while that's good news for novice Internet users who have just installed the operating system, it's unlikely to convince others to switch from Netscape Communications Corp.'s Netscape Navigator.

Microsoft and its partners will have to come up with some killer server-based applications to convince people that life's just not worth living without the only browser that can support them – or at least the only one that can support them before other browser vendors catch up.

First, the basics: Internet Explorer, available for free download from Microsoft's Web site (<http://www.microsoft.com/windows/ie/iexplorer.htm>), gives you everything you'd expect in a browser these days. (It also ships as part of Microsoft's Plus add-on package for Win95. But given the rate at which browsers

what the rest of the on-line world calls bookmarks. (Microsoft has an annoying habit of renaming Web terms.)

Netscape stores bookmarks in a single file. Internet Explorer uses Windows 95's Explorer (what in Windows 3.1 was called File Manager) to handle bookmarks. When you save a link to a given Web page, you create a small file in a Favorites directory that you can edit or move around.

One caveat: The names are in Windows 95 long-name format, so if you're still using an old-fashioned 16-bit application that can only support 8-character names, you might have problems.

Because the bookmarks are folder items, you can even create shortcuts that reside on your desktop – similar to program icons. Click on one of these shortcuts and Internet Explorer will be launched to connect you to the linked site. The 32-bit version of Netscape

has a similar, but slightly harder-to-use feature.

Internet Explorer also does a much better job than Netscape in moving pieces of pages from the brows-

er to another application. If you start highlighting in Internet Explorer, the page scrolls up or down as long as you push the mouse while holding down the left button. It's the way you'd expect a Windows application to work, but, surprisingly, Netscape does not – at least not in its current 1.X versions.

And Internet Explorer comes with a built-in RealAudio module to support real-time audio, as well as an interesting, if ultimately trivial, feature that lets you save any Web graphic as a desktop background with a couple of mouse clicks.

The flip side

But Internet Explorer lags behind Netscape in other areas.

It does not support Netscape's server-push mechanism, which allows for more complex animations. That means that instead of seeing, say, a clever animation, Explorer users would see only a "broken graphic" icon. Server-push lets a Web site link the browser to a script that swaps in new graphics at a set interval. Although Netscape pioneered the technique, it can now be done on a variety of servers.

More importantly, Internet Explorer's Usenet newsreader is lame. Rather than organizing newsgroups in hierarchies as Netscape does, it displays every single newsgroup in one list. If your provider carries several thousand newsgroups, that can be mighty annoying – especially since you get the entire list all the time. There's no way to set up a "reading list" as Netscape (and, indeed, 10-year-old text-based Usenet readers) lets you do.

You can use the Find command to search for specific newsgroups, but there's no Find icon on the toolbar. You have to bring down the Edit menu to find it. One wonders why Microsoft didn't put one of those binocular buttons on the toolbar like everybody else (including the Microsoft engineers who developed WinPad).

Even worse, the reader doesn't thread messages. Once you finally find a newsgroup and open it up, you find all the messages in chronological order rather than organized according to topic. It makes following a discussion impossible in all but the quietest of newsgroups.

Unfortunately, while Internet Explorer lets you swap out its built-in telnet and gopher clients (Gopher? Now there's a blast from the past), you're stuck with the

Microsoft's Web browser offers some useful features, but don't expect loyal Netscape Navigator users to jump ship.

By Adam Gaffin

are updated, you might as well just get it off the Web. I downloaded three revised versions in the course of a month.)

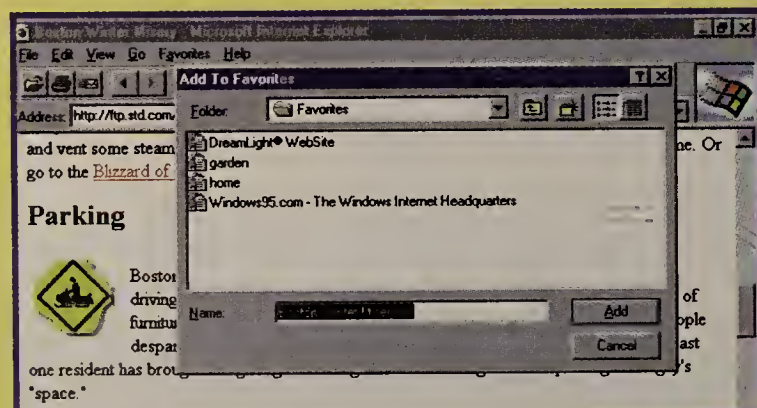
Like Netscape and other browsers, Internet Explorer paints text on the screen before graphics and supports interlaced GIF and progressive JPEG images, so you can start reading a Web document right away. Some say it loads text and images faster than Netscape, although I didn't notice any significant difference. Like Netscape, you can spawn multiple windows to connect to several Internet sites at once, including FTP and telnet sites.

Microsoft's browser supports Netscape's Secure Socket Layers encryption system, so you can make credit card purchases over the 'Net without worrying too much about your personal financial info being waylaid. Microsoft says it will also support a separate security system that it is developing with credit card companies and other vendors.

Internet Explorer supports such Netscape/HTML 3 enhancements as tables, background colors and images, and text-wrapping around graphics – absolute musts when so many Web sites now incorporate these features. Internet Explorer also supports Netscape's "client pull" system, which allows for relatively simple animation and screen updates.

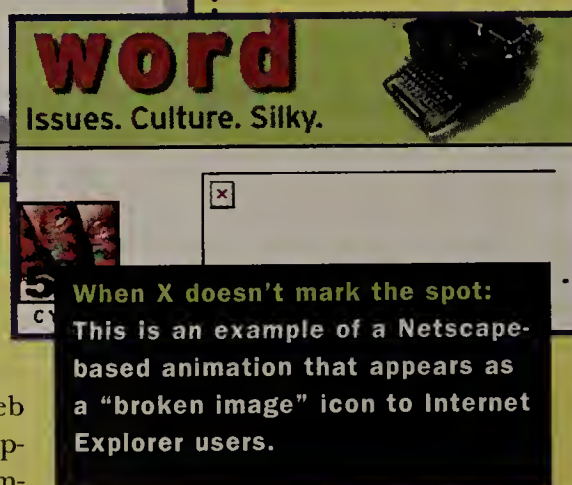
And, like Netscape, Internet Explorer allows for plug-in applications, such as Microsoft's own Virtual Reality Markup Language module (also available for free from Microsoft's Web site), which lets users navigate through on-line 3-D "worlds."

The browser enhances all this through its complete integration with the Windows 95 operating system. Take, for example, the way it handles "Favorites" –

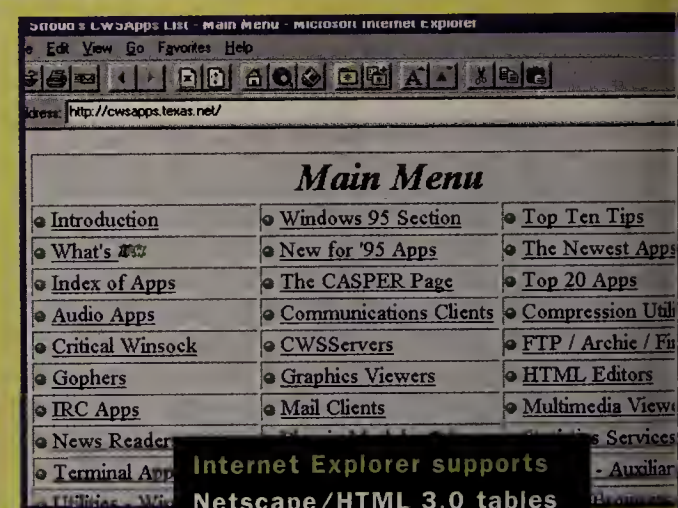


The flu

Adding a bookmark, or "favorite" in Microsoftspeak, is easy in Internet Explorer, but takes two mouse clicks instead of one.



When X doesn't mark the spot: This is an example of a Netscape-based animation that appears as a "broken image" icon to Internet Explorer users.



Internet Explorer supports Netscape/HTML 3.0 tables but not Netscape frames.

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Usenet reader. That is, unless you use your old friend, alt-tab, to switch to a real Usenet package such as the excellent Free Agent (available at <http://www.fortinc.com/forte>).

Another problem crops up if you foolishly decided not to enable Exchange as your mail client when installing Windows 95.

Internet Explorer relies on Exchange for E-mail, responding privately to

Usenet postings or mailing copies of Web documents. If you were happy with Pegasus or Eudora and saw no reason to switch to Exchange, you're out of luck. And you won't be able to swap out another E-mail package for use within Internet Explorer – there's no way to change the default mail package.

One minor annoyance in Internet Explorer is that it takes two clicks to add a bookmark or favorite (first you click on

"Add to Favorites," then on "OK"), rather than the one that other browsers require. Also annoying is what happens if, when downloading a file, you try to go to another site. Internet Explorer asks you if you really want to stop the download, unlike Netscape 1.2 and later versions, which automatically spawn a new window.

While Netscape doesn't let you swap in another E-mail client either, it comes with a built-in E-mail client that, while

simple, at least works well enough for sending URLs or copies of interesting pages to friends.

One feature of potential concern to network managers: Internet Explorer lets users have their computers automatically run any programs as soon as it finishes downloading them from an Internet site. Although you have to click in a box after reading a warning about viruses, the potential for users infecting their machines seems a bit too high. One can rig a similar auto-run system in Netscape and other browsers, but it requires some mucking about in the "helper apps" area – enough to give an over-eager user some pause.

The last word

What's the upshot?

Well, Microsoft has delivered a fairly functional browser. But over the long term, you'll still have to worry about compatibility issues between clients and servers. Microsoft says it supports TCP/IP standards, but as we've seen time and again, vendors often have a funny way of defining "standards-based."

As HTML and HTTP grow more complex, network managers will face increasingly complex choices when settling on Web browsers. Can the world survive half-Netscape, half-Microsoft?

You already can get a taste of what could happen. Use Internet Explorer to connect to the on-line magazine *Word* (<http://www.word.com>). You'll see a series of interesting graphics and two broken images icons. Switch to Netscape and connect to the site, and in place of the broken images, you'll see a toolbar down the left side of the screen and a small moving image which changes from week to week. Word uses MPEG and Netscape's server-push system to create animation – neither of which Internet Explorer supports.

For another example use Netscape to connect to <http://www.vnet.net/users/mauricej/>. You'll get a static, if colorful, page. Change to Internet Explorer, and you'll also get a scrolling marquee and music will come out of your speakers. This is because this site supports Internet Explorer-only tags for displaying moving text and audio.

So despite all the commitment to "standards" (the next generation of HTML, Version 3.0, has yet to be finalized by the World-Wide Web Consortium), we might yet end up with a Betamax-vs.-VHS Web.

The question is, which company will have the winning format? Even if the major browser vendors fully support HTML 3.0, they will still have their own proprietary tags. ✱

Gaffin is on-line editor of *Network World Fusion* (<http://www.nwfusion.com>), and he's worried that an impending Web standards battle will drive him to Lynx. You can reach him at gaffin@nww.com.

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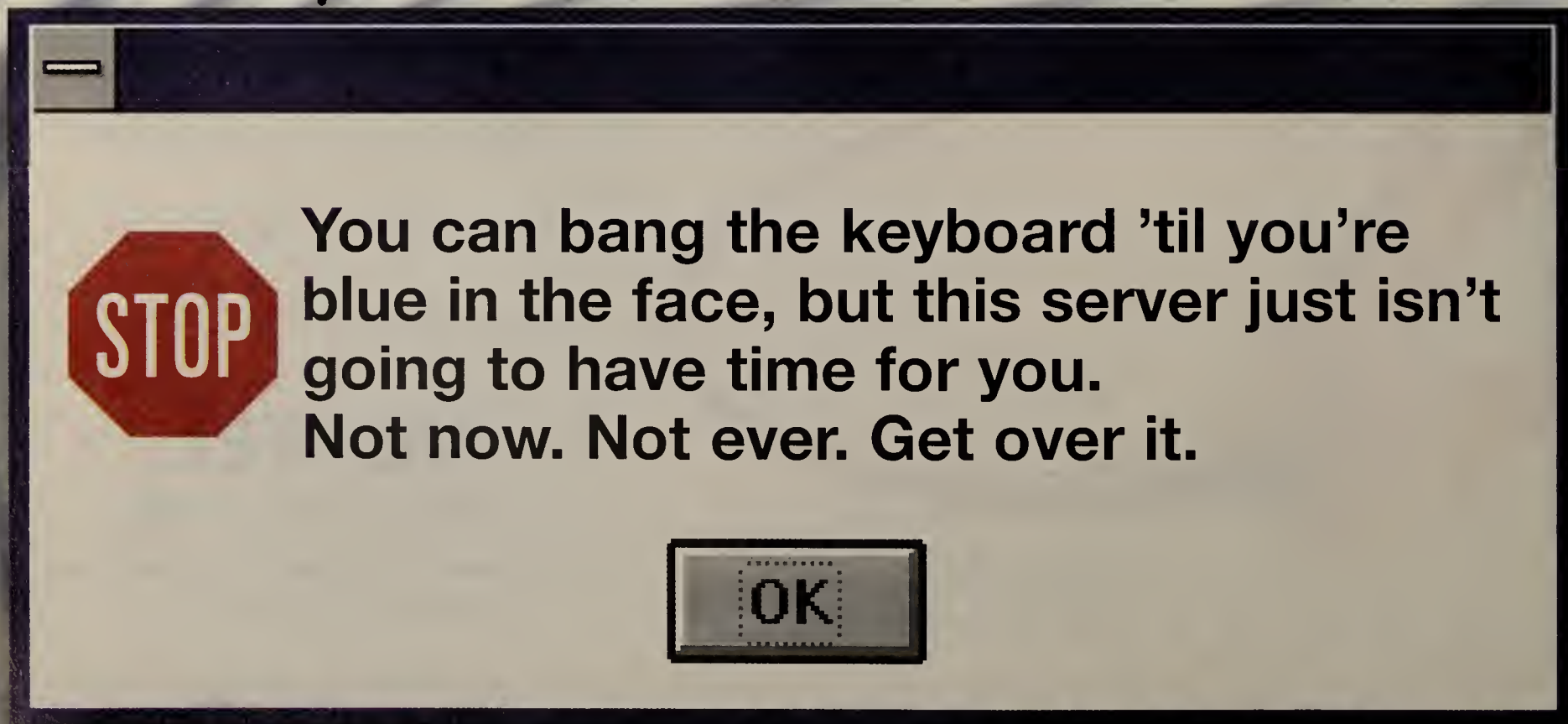
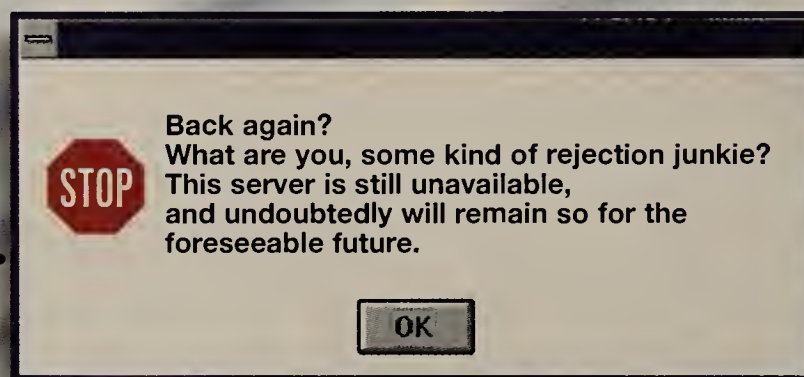
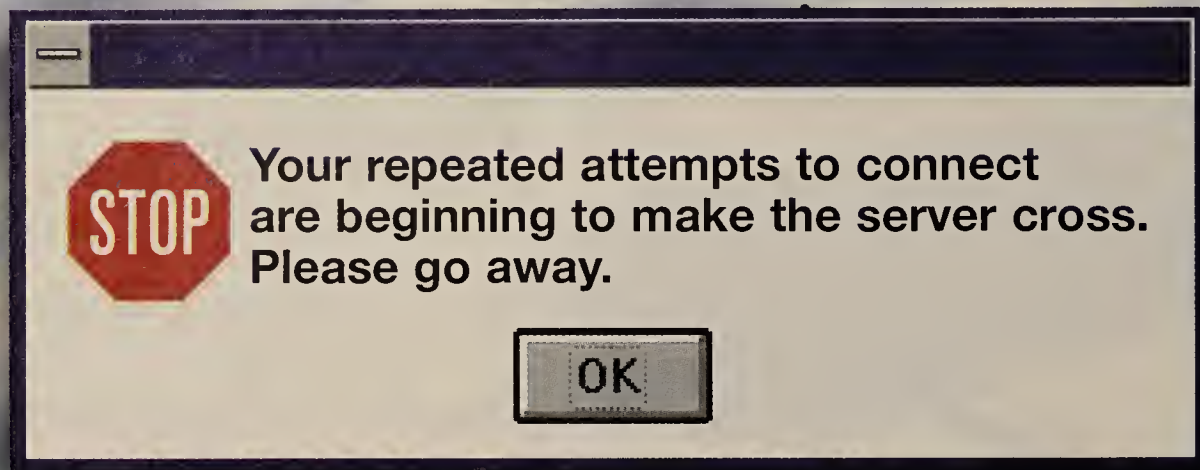
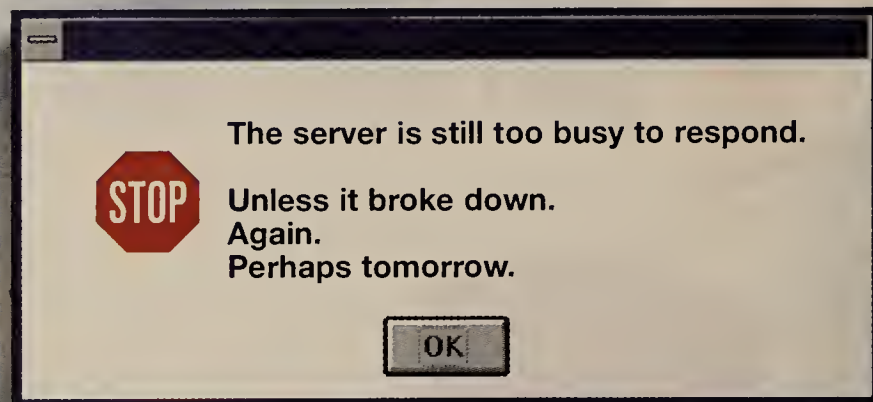
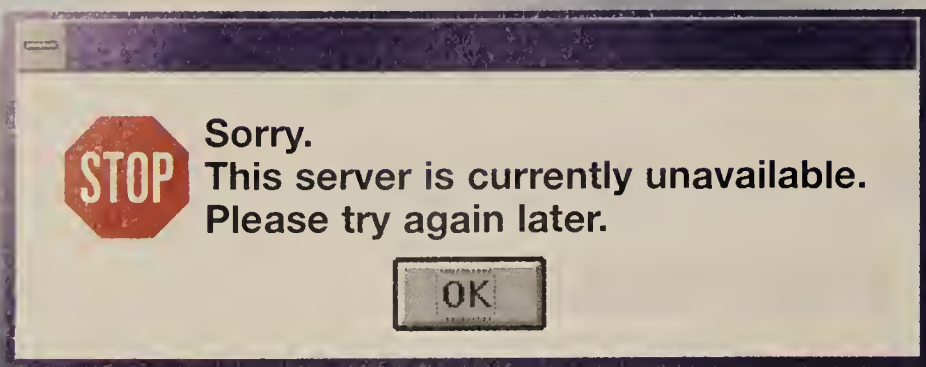
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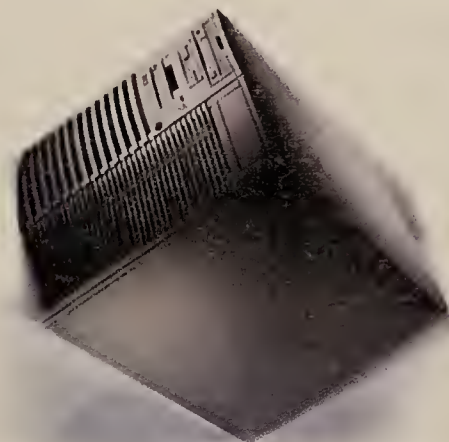
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There's a certain old-fashioned comfort in knowing that it's not technology alone that makes for business success on the Internet.

Internet winners have found that success doesn't lie in high-end technology platforms, but in delivering better value, meaningful information or service to specific markets. And Internet business losers – and they're out there, despite the hype – are those who discover that the medium is not easy to exploit and doesn't guarantee a quick return.

A clear winner

From its earliest research and development days, the Internet has worked superbly as an information resource – a tool that lets people make active choices about the information they wish to obtain. So it's no surprise that DealerNet, the Seattle-based

DealerNet's success on-line has given Pete Wilson plenty of reasons to smile.

Good times on the Web

virtual Automobile Row, is succeeding as an on-line business because the service makes it easy for potential car buyers to seek out the information they want on cars and dealerships.

DealerNet, a cooperative advertising network, has signed on more than 100 U.S. automobile dealers that pay monthly fees ranging from \$495 to \$695, plus initial setup charges of \$1,495 to \$2,495, for visibility through the DealerNet site. Compare that to the minimum \$10,000 per

for a particular vehicle, but also the horsepower average for that class of car and the high- and low-horsepower vehicles within the class.

DealerNet has always invested heavily in links throughout the rest of the Web – with access from Infoseek, America Online, Global Network Navigator, Internet Life, The Microsoft Network, Sight-Seeing Guide and Hotwired. With this multiplicity of cross-references, it's easy for Internet surfers to find DealerNet.

DealerNet also is creating forums and chat areas for car buyers, because 'Net users have always liked to share experiences and opinions, as well as information. And a savvy 'Net business such as DealerNet will honor that tradition. The service makes its Web site a place for anyone who wants to talk about comparison shopping for new cars.

DealerNet runs on Silicon Graphics, Inc. (SGI) servers – a natural for a graphics-intensive service displaying pictures of new cars – and uses the National Center for Supercomputing Applications' Web server software. Unlike more static sites, where

the visitor's experience is defined well in advance, most of DealerNet's Web pages are built on-the-fly.

When a DealerNet user is interested in a Mazda Miata, for instance, the SGI servers craft a custom Web page, pulling together data about the sports car with contact information about the closest dealer.

Pete Wilson, DealerNet operations manager, says the company has been careful to offer acceptable performance for customers with only 14.4K bit/sec modems. But DealerNet's peak usage is during the business day, and customers typically have higher speed access to the site.

A defining experience

DealerNet was started in 1994 by Marty Rood, a Seattle-based dealer of Nissans and Volvos, after he attended a conference on the Internet at the University of Washington and spent some time with the folks at Spry, Inc.

The start-up was later purchased by Reynolds and Reynolds Co. of Dayton, Ohio, which holds 90% of the market for paper forms used by automobile dealers. More important, the Midwestern company is the biggest provider of information technology products and services to auto dealers.

Although DealerNet is not yet linked to the SGI

What makes for a successful electronic commerce venture? Here's what two companies learned by bringing their businesses on-line.

month dealers might pay for newspaper advertising.

The DealerNet service allows consumers to look at pictures of new cars and grab automobile specifications. For example, DealerNet users can ask the service to generate a list of cars with certain technical specifications – say, convertibles with 8-cylinder engines – or within a certain price range.

They also can be linked to the closest dealer offering the car they want. Users get the dealer's phone number, URL, electronic mail and street address, and in some cases, a map of the dealer's location.

Making good use of World-Wide Web hyperlink technology, DealerNet offers information with lots of granularity. For example, users clicking on a horsepower button are not only shown the specifics

workstations that reside in all Reynolds and Reynolds client-automobile dealerships, there are plans afoot to make those connections.

Once these islands are linked, buyers will have easy access to all information about an automobile dealer. Through the Internet, customers will be able to check on the status of a car repair, for example, or inquire about the availability of parts.

"The dealers that sign up with us are very progressive and consumer-oriented. The ones that think they can keep selling cars like they always have will be out of business in 10 years," says DealerNet's Wilson.

As part of its service, DealerNet offers virtual domain hosting – giving dealers their own Internet domain name, such as "Saturn DealerInMadison.Com" – and augments marketing materials the dealers may have developed for other media.

The service helps each dealer craft its image, whether elegant (as for the largest Lexus dealer in the world) or more cost-conscious ("Some Ford dealers are really duking it out over Explorer prices.").

At this point, DealerNet officials are more concerned with creating mind share and market share than maximizing profit. While founders Rood and Wilson did well when they were bought out by Reynolds and Reynolds, both they and their parent company know that the real returns will come later on, as the 'Net matures as a marketplace.

For now, DealerNet offers dealers a novel advertising medium at a fraction of the cost of more traditional outlets, such as newspapers, and lets dealers establish themselves as pioneers in an emerging market. By establishing itself as the national car-buying location on the Internet – a service that grew out of the founders' off-'Net expertise – the company is likely to reap big profits as Internet use grows.

A thoughtful loser

But for every winner at the game of business on the 'Net, there also are losers who have not been able to capitalize on their markets.

The Casitas Village housing association of Carpinteria, Calif., the fifth largest housing association in Santa Barbara County, has abandoned its venture into the Web. The association's management saw no clear return on its investment after a period of several months, although there was great untapped potential to reach Web users looking for coastal real estate in Southern California. There also was the opportunity to form a marketing consortium with the other 150,000 homeowner associations in the U.S.

Robert Ooley, who is also an IT officer for Santa Barbara County, was the force behind the abandoned Web site and envisioned it serving a number of useful purposes, including providing an information resource for Casitas Village property owners; acting as a marketing tool to attract new buyers; and helping to build up the development's image.

"Lots of our owners are out of county, out of state

and out of the country, and some of our off-site owners are very computer savvy," Ooley says. The Web site would have enabled them to keep tabs on the housing association and their property.

The Web site also would have enabled Casitas Village to mark out its identity on the Web as a resource for those interested in high-density living – that is, those interested in apartments, condos and residences other than single-family houses on individual parcels of land.

"There are [Web] sites for architects and planners, but not the end users," who are the homeowners themselves, Ooley says. At a time when there is a national oversupply of high-density developments, Casitas Village would have been able to brand itself as a leader in service by providing authoritative information on the Web.

Ooley also wanted to use the site as a way to speed up internal business operations and improve communications. The association's attorney and its accountants, for example, already had E-mail, so closing the loop and bringing everyone on-line made good business sense.

But Ooley and the housing association foundered on the obstacle that many small businesses encounter on the 'Net: There was no immediate return on investment. The organization couldn't translate its spending on the Web into hard dollars from sales of new units, for example.

What's more, Ooley ran smack into another problem that bedevils those trying to make commercial use of the 'Net: The association's business processes did not easily lend themselves to the Web.

For example, he envisioned owners becoming

and

bad

By Paulina
Borsook

Robert Ooley of the
Casitas Village housing
association learned some
tough lessons on-line.



A tale of two sites

WINNER LOSER

COMPANY: DealerNet

SITE: www.dealernet.com

BUSINESS: Cooperative advertising

- FACTORS:**
1. Funded with expectations of long-term market-building rather than short-term payoff
 2. Focused on well-defined, market niche understood by founders
 3. Extensively cross-linked from other sites throughout 'Net
 4. Highly customizable, both for advertisers and end users

COMPANY: Casitas Village

SITE: Shut down

BUSINESS: Housing association

- FACTORS:**
1. Couldn't meet management's expectations of tangible payoff in short time frame
 2. Tried to handle too many jobs with too few resources
 3. Web project did not mesh well with business practices
 4. Site developed before demand arose for it

In short, Ooley hoped the very existence of the Web site would make Casitas Village appear to be more desirable – more up-to-date, better managed and better maintained. And with this enhancement of the development's image, its property values might have appreciated in the slumping Southern California real estate market.

more informed and involved in the operation of the development by being able to peruse information about the association's business meetings. But the business office was not accustomed to typing up the minutes of a monthly board meeting until just before the next meeting.

This lack of timeliness made the investment in technology seem superfluous, even extravagant. And timeliness never became a priority for the business.

Perhaps because the Web site was asked to prove its

worth in too short a time and was not narrowly focused – after all, Ooley was hoping to serve existing property owners, potential property owners and the Internet community at large – management ceased funding the site three months after it went up.

Unlike DealerNet, where the business was willing – and funded – to take the long view and returns weren't expected to be immediate, the association's man-

agement demanded a short-term payoff.

But that long-term view may be a luxury small businesses can't afford. Many simply may not be able to justify the cost of establishing a Web presence. What's more, the value of image advertising and improved customer service – prime goals for many Web undertakings – are always difficult to quantify, whether on the Internet or off. When every dollar counts for a small business, the intangibles of

'Net business simply may not add up.

For now, that is. In the near future, businesses may come to see doing business on the Internet as natural and as necessary as listing themselves in the phone book or having an 800 number. ■

San Francisco-based Borsook (loris@well.com) has work appearing in Wired, Newsweek Japan and an upcoming Seal Press anthology on women and cyberspace.

Xylan regrets that it is not a billion-dollar company. By way of apology, we would like to offer the following:

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- 2 Token Ring: UTP, STP, Fiber
- 3 FDDI: Multimode, Single Mode, UTP (CDDI), DAS, SAS
- 4 100BaseT: 100BaseTX
- 5 ATM: OC-3 Multimode, OC-3 Single Mode, OC-3 UTP, STM-1, DS-3

Broad Choice of Switching and Routing Options

- 6 Transparent Bridging (802.1d Spanning Tree)
- 7 Source Route Bridging
- 8 Source Route / Transparent Bridging (SRT)
- 9 Virtual Rings
- 10 Optimized Device Switching
- 11 Broadcast and Multicast Flood Limiting
- 12 IP Routing
- 13 IPX Routing
- 14 Automatic MAC-Layer Translation
- 15 Very Low Latency
- 16 LAN Encapsulation (RFC 1483)
- 17 IP Over ATM (RFC 1577)
- 18 ATM Forum LAN Emulation Client (LANE 1.0)
- 19 Optimized LAN Emulation
- 20 Optimized Trunking Protocol

AutoTracker – Policy-Based Virtual LANs

- 21 Policies Defined in NMS
- 22 Port Group Policies
- 23 MAC-Layer Address Policies
- 24 Protocol Type Policies

25 Network-Layer Address Policies

26 User-Defined Policies

OmniVision – Creative Network Management

- 27 Switch Manager
- 28 AutoTracker Manager
- 29 HP OpenView for Windows
- 30 HP OpenView for UNIX
- 31 SunSoft SunNet Manager
- 32 IBM NetView for AIX
- 33 ASCII Console
- 34 Network-Downloadable Software and Configuration
- 35 RMON

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- 36 Nine-Slot Modular OmniSwitch
- 37 Five-Slot Modular OmniSwitch
- 38 12-Port PizzaSwitch with Modular High-Speed I/O
- 39 Same Hardware and Software Technology Across All Platforms
- 40 Wire-Speed Switching
- 41 Distributed Switching Architecture; Frames Moved Once Across Bus
- 42 Two RISC Processors and Five ASICs per Switching Module
- 43 Global Safety and Emissions Listings
- 44 Wall-Mount and Rack-Mount Options

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47 Efficient 13.2 Gbps Fabric

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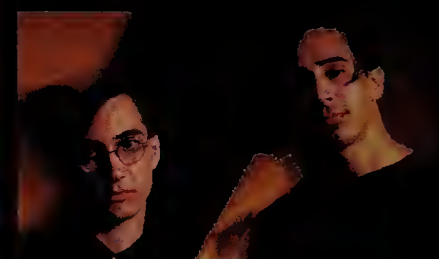
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Rules for Radicals

Joey Anuff (aka The Duke of URL) and his partner Carl Steadman (aka Webster) are coproducers of *Suck* (www.suck.com), a San Francisco-based on-line magazine – or E-zine. These smart-as-whips 20-some-things used defiance and attitude, and not technology, to become winners on the Internet by pointing out the losers in the realm of digital convergence.

Anuff and Steadman were production assistants at HotWired, *Wired* magazine's



Winners Steadman and Anuff

on-line entity. They started *Suck* in their off-hours as the Spy magazine of the Web. *Suck* has no qualms about skewering nonsense and cyberfluff, as the two founders call it.

And by providing wit, bite and a high degree of technical, business and general-purpose literacy on a daily basis, *Suck* became the object of a bidding war by various big-business media combines seeking a lively site to attract advertisers.

As a consequence, *Suck* is now an independent business unit of HotWired. Anuff and Steadman have quit their day jobs to tend to the new venture, and are staffing up to create a minor media empire of their own.

Suck is a 'Net winner because it offers entertainment, information and points of view that cannot be obtained elsewhere.

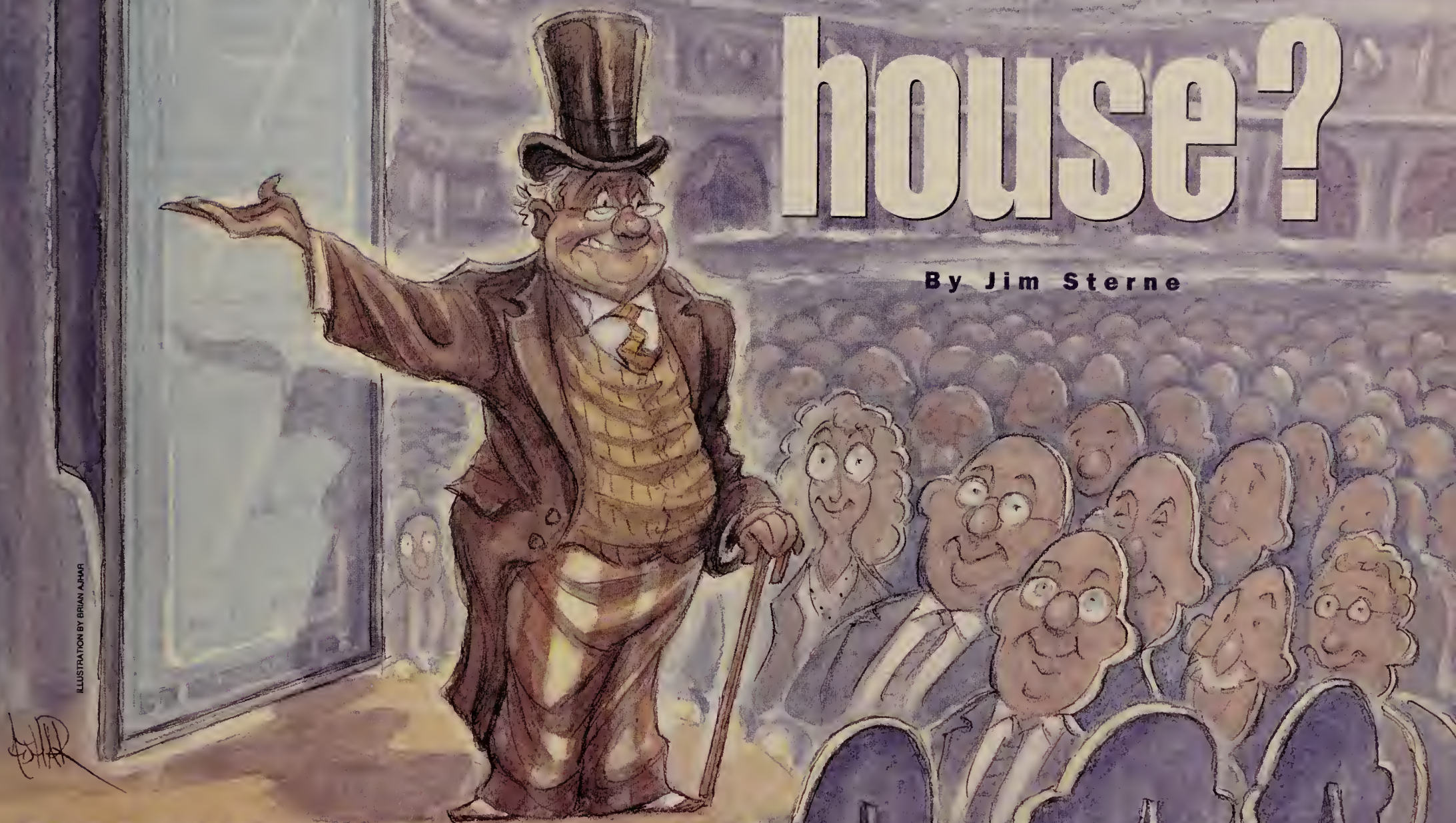
As for the *Suck* philosophy of what works and what doesn't on the Web, Anuff has no kind words for what he calls "nth-generation repurposing" of information or material that has a "transparently self-serving premise." Businesses that fill up their Web sites with press releases then complain that they're not getting the hits they had been counting on just don't get it.

Anuff does not believe that appealing to the lowest common denominator is the correct approach for the 'Net. He believes successful entrepreneurs should approach the creation of 'Net content with an "artisan mentality, creating what 'I would want to see."

By Paulina Borsook

Are you playing to a full house?

By Jim Sterne



Internet surveys show one big, happy audience, but here's what you really need to know about 'Net demographics before bringing the curtain up on your Web site.

British Statesman Benjamin Disraeli, 1st Earl of Beaconsfield, twice prime minister and the purchaser of the Suez Canal, once remarked that "there are three kinds of lies: lies, damned lies, and statistics."

Pretty perceptive for someone who died before the dawn of the research age – with Nielsen ratings and Harris polls ad infinitum, and all these Internet surveys that are popping up today.

As a businessperson, you have to deal with bottom-line ques-

tions like: Is your intended audience on the Internet? Can you expect a reasonable ROI? How much should you invest in your World-Wide Web site?

To arrive at rational answers, you need to know who's on the Internet. How old are they? Do they have any money? Will they give some to you?

Desperate for answers

To solve these mysteries, you can turn to the myriad surveys

that claim to plumb the depths of the Internet and describe its denizens. There are surveys from universities, Internet access providers and on-line content providers, to name a few.

But before digging into the results, you should take a moment to consider how the studies are conceived, gestated and brought forth upon the world. This will help you make the best use of the results and give you some sense of why Disraeli felt the way he did.

Some of the surveys floating around the Internet and the media these days are the type made possible by the very technology used to conduct them. This sort of survey is created on the Web. "Wow!" says the enterprising graduate student. "We can create a form on a Web page and people can tell us who they are and what they like."

This is known as a self-fulfilling fallacy.

The Graphics, Visualization & Usability Center at the Georgia Institute of Technology's College of Computing in Atlanta is mercifully known as the Gvu. The Gvu's 4th WWW User Survey was run for one month in the fall of 1995, meaning Gvu posted a Web-based form for surfers to fill out on their way through cyberspace.

As a result, we know something about the 23,000 people who were already on the Web, were able to find their way to the Gvu Web site, were willing to fill out

"But it would be a mistake to lump the populations of New York, Los Angeles and London together and call them a single market. The same applies to the Internet."

the survey and clearly have too much time on their hands. Of course, we don't know what percentage of the total population they represent or their motivation for answering a bunch of questions. But what the heck, it's only numbers.

If you wish to rely on this survey methodology, then you should plan your Web presence for a 35-year-old married man with an income of \$63,000 who is on-line with a 14.4K bit/sec modem once a day – usually from work – for a total of six to 10 hours a week.

But creating a business plan or avoiding the Internet based on this profile would be a mistake. And writing off this survey completely would mean missing some interesting findings:

- 80% of respondents said they navigate primarily by Hotlist/Bookmark.
- 95% find out about Web pages from other Web pages. This result highlights the importance of having other Web site owners provide a link to your page or cross-referencing your site on their home pages.
- 51% paid for Internet access themselves, 33% received it through work, and 25% played on their school's dime.
- 62% use Windows, while 21% use Macintosh.
- The most common connection speed is 14.4K bit/sec (34%) – so don't load up on those heavy-duty graphics – followed by 28.8K bit/sec (27%).
- The most common use of the Internet is for downloading software updates or acquiring new software. This is followed closely by searching for reference information, with on-line shopping getting the lowest rating.
- 60% have been on the Internet less than one year, with 28% surfing for less than six months.

Figures that mean business

O'Reilly & Associates, Inc. of Sebastopol, Calif., took a whack at providing Internet demographics by using a sampling technique known as random digit dialing and completing interviews with 29,901 individuals.

Based on those interviews, O'Reilly estimated the Internet world to be populated by some 10 million users. That's a third less than some other surveys, but O'Reilly didn't count users of on-line services, such as Prodigy and America Online.

According to O'Reilly, the average Internet user is a 36-year-old male with an income of \$63,000 – a finding remarkably close to Gvu's.

Austin, Texas-based Matrix Information and Directory Services (MIDS) "conducts ongoing investigations about the size, shape and other characteristics of the Internet and other networks in the Matrix." Its latest survey results, released in December 1994, claimed there are 13.5 million Web users and 27.5 million people who do the electronic mail thing.

MIDS' next "How big is the Internet?" study will be released soon, and will most likely interest Internet equipment makers and service providers rather than marketing folks. It focuses more on the architectural side of the coin than the buying side.

Message from the mountain

Not to be left out of the picture is Nielsen Media Research, those proctors of public opinion, which teamed up with CommerceNet (CN), a consortium of electronics corporations, to divine the truth about the Internet.

We take you now to what would once have been a smoke-filled room, but today is filled with bottles of mineral water, Starbucks double cappuccinos, bran muffins and a team of well-intentioned questionnaire designers. They want to know how many people are on the Web. Why? Because their careers depend on the continued growth of the Internet. If their survey determines the Internet is populated by underemployed, oversexed, penniless, male graduate students, they will have to find new jobs.

So, when it comes time to create just the right question to be asked in just the right way, the discussion goes something like this:

"Let's call random telephone numbers so we get a true cross-section."

"Right, then we'll ask them if they have a dial-up or a SLIP account."

"No, no, no. They may be connected at work or have America Online and not know what kind of connection they've got. In fact, they might use their parents' account or their friend's account."

"Right, so we ask, 'Do you have access to the Internet or an on-line service at work and/or at home?'"

"Or through a friend."

"Right. Or through a friend."

This is tantamount to asking if you have access to U.S. Interstate 10.

Do you have a car? Does your company have a car? Can you steal a car? Flag a taxi? Catch a Greyhound? Do you know somebody who can drive? Ah-ha! You have access. Therefore, we can predict the flow of rush-hour traffic and tell you whether the people on the road are prospective customers.

Stranger ways of calculating market size and value exist. For decades, the Nielsen company has relied on television diaries filled out by a handful of supposedly normal people. The Nielsen ratings are derived from those viewing habits and projected onto the rest of the us; it's the standard way to determine TV market share and set advertising fees.

As a nation, we are already accustomed to market evaluation based on people with too much time on their hands. Have you ever met a Nielsen family? They aren't plentiful.

Keep in mind that merely invoking the phrase "Nielsen ratings" in a corporate boardroom is enough to lull unsuspecting management money mongers into loosening the purse strings. Therefore, the survey effort is worth recounting.

On a random basis, Nielsen Media Research called thousands of people and managed to get 4,200 of them to answer 40 multiple-part questions (no mean feat, to be sure). They were careful to categorize Internet users, on-line service users and just plain-old folks with better things to do.


According to the details at the CN Web site, some of the key findings are:

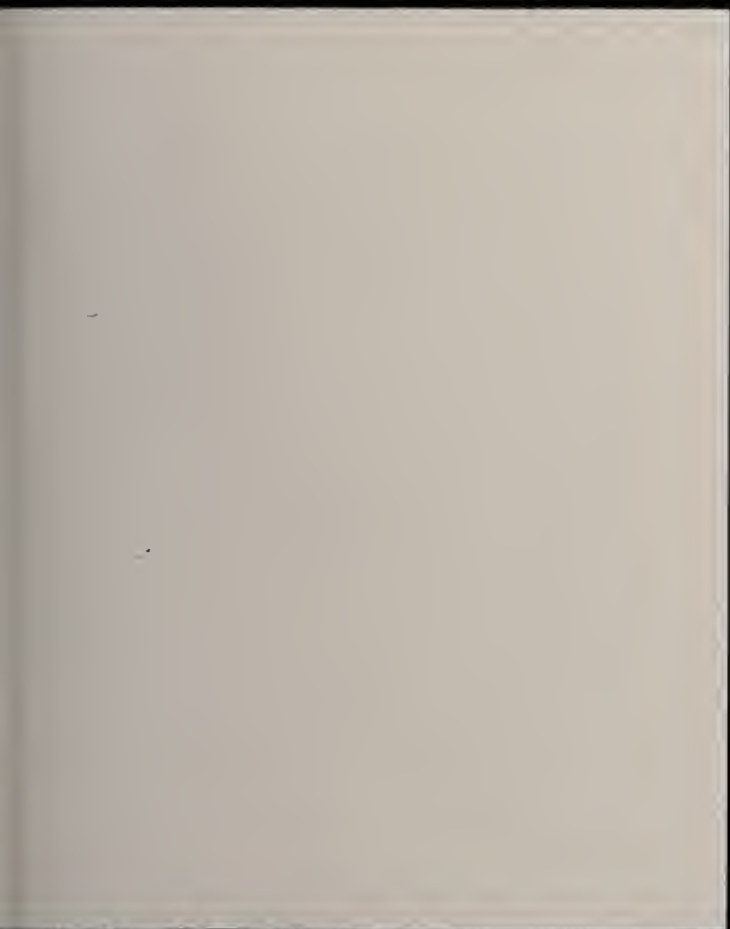
- 17% (37 million) of people 16 and over in the U.S. and Canada have access to the Internet.
- 11% (24 million) have actually used the Internet in the past three months.
- Approximately 8% (18 million) have used the Web in the past three months.
- Users average five hours and 28 minutes per week on the Internet.

WEB SEARCHING

**Where to find
the sites
and surveys
mentioned**

- # Gvu's 3rd WWW User Survey: <http://www.cc.gatech.edu/gvu/user/surveys>.
- # MIDS: <http://www.mids.org/mids/index.html>
- # O'Reilly & Associates: <http://www.ora.com/gnn/bus/ora/info/research/index.html>
- # CommerceNet: <http://www.commerce.net>
- # Donna L. Hoffman: <http://www2000.ogsm.vanderbilt.edu>
- # Oak Ridge Research: <http://www.oakridge.com>







HOMEWORK ASSIGNMENT

Compare and contrast the following Internet surveys

	MIDS	GVU	O'Reilly	CA/Nielsen
Survey date	10/94	5/95	10/95	11/95
Average Age	NA	35	36	NA
Male	NA	82%*	65%	66%*
Female	NA	15.5%*	35%	33%*
Average Income	NA	\$69,000	\$63,000	25% > \$80,000
Married	NA	50%	NA	NA
Average Hrs./week	NA	9.6	NA	5.5
College grad.	NA	NA	NA	64%
Total users	27.5 million	NA	10 million	37 million

* Some respondents declined to answer.

Note: NA=Not available



- People in the U.S. and Canada spend about the same amount of time on the Internet as they do watching rented videotapes.
- Males represent 66% of Internet users and account for 77% of Internet usage.
- On average, Web users are upscale (25% have incomes over \$80,000), professional (50% are professional or managerial) and well-educated (64% have at least a college degree).
- Approximately 14% (2.5 million) of Web users have purchased products or services over the Internet.

Now comes the kicker

Donna Hoffman, an associate professor at Vanderbilt University and a well-known Web marketing academic, says these numbers are skewed. Hoffman says the survey had an overabundance of older, wealthier and better-educated people compared to the 1990 U.S. Census.

Hoffman should know. She was the principal academic advisor helping the folks who designed the CN/Nielsen survey. Now that she's seen the raw data, she's figured out that her advice wasn't heeded.

In the past three months, 24 million people used the Internet? More like 10 million, Hoffman says.

Some notes from Hoffman's own Web site show how the CN/Nielsen findings differ from random sampling, based on census data:

- 25% of census respondents did not complete high school vs. 11% of CN/Nielsen survey respondents. (The bias becomes even more pronounced when you remove data for 16- and 17-year-olds from the CN/Nielsen survey to make it comparable to the census, which is based on people 18 and older.)
- 18% of census respondents have a bachelor's degree or higher education, compared to 28% of CN/Nielsen respondents.

The implication of these and other comparisons is that the CN/Nielsen survey has overstated the number of Internet users.

Oh, well. Will we never know the truth about who is on the Internet? Are we doomed to spend the rest of our days wondering if we should spend more on the Web than on direct mail? Perhaps we should survey the surveys, trying to cull an overall picture from the various findings.

One could conclude that selling expensive and sophisticated guy toys might be the way to go. These men of the Internet have money, are educated and like to surf the Web. One could assume a Web site designed for this modern modem-man would be a sure hit.

But, one would be wrong. Way wrong.

What the numbers don't tell you

All of these surveys are carefully created and hotly disputed. Statisticians have no end of fun poking holes in each other's methodologies. (To paraphrase the old joke about economists, "if you laid all the statisticians in America end-to-end, they still wouldn't reach a conclusion.")

You may select the survey results that best support your approach, your plans and your budget request. But those numbers won't tell you that capitalizing on the Internet is very different from other forms of marketing.

The Internet is not about mass market. It is not a community of like-minded, like-income clones who will flock to the product that fits their demographics to a tee. The Internet is not about homogeneity. It's not about conforming.

It's attractive to lots of different people because each one can find something that interests him or her in particular.

So, rather than relying on broad generalizations from a mass-market survey, a better approach is to generate your own Internet statistics. In short, survey your own customers and potential customers.

Ask them if they are on the Internet. What is their mode of access? At what speed? What do they do when they are on the Internet? Would they buy something on-line?

If they're not on-line, ask them what you could offer on your Web site that would be compelling enough to get them on the Internet. Then ask the people who visit your Web site how they like it and how you can improve the site. It is for them, after all.

And take heart in another recent Internet survey conducted by Oak Ridge Research of San Marcos, Texas, that shows Internet business pioneers meeting with success on-line.

Oak Ridge talked to almost 450 companies doing business on-line to see if they were making money on the Internet. More than 80% said they were.

Are these companies counting demographic statistics? No, they're counting their own returns on investment. Are they selling to an Internet mass market? No. But almost 70% of them are reaching the people they want to reach well enough that they are satisfied with their ROI.

The good news

This ROI took anywhere from a couple of weeks to a year-and-a-half for sales-only sites and from six months to two years for marketing-only sites.

Want more good news? One of the most telling things about the various demographic surveys is how they compare to their previous incarnations. All the surveys that have had more than one outing point in the same direction: The 'Net is growing and the population is becoming more and more diverse.

But it would be a mistake to lump the populations of New York, Los Angeles and London together and call them a single market. The same applies to the Internet. Web sites designed for the Internet as mass market are designed with the broadcast medium in mind.

They are designed without the realization that the Web is a two-way communications device. It's not a TV, a radio or a magazine. It's much more like a telephone.

The surveys discussed above represent some groundbreaking work done by scholars and savvy businesspeople. But given this new type of medium, the value of the results is in question. As you peruse them, keep in mind the words of Stanley Marcus, chairman emeritus of Neiman Marcus, "Consumers are statistics. Customers are people." ♦

Sterne has spent more than 15 years in technical sales and marketing and produced the world's first Marketing on the Internet seminar series. For the past two years, he has devoted his attention to consulting on the Internet as a marketing medium. His new book, World Wide Web Marketing, is available from John Wiley & Sons, New York.

"We develop software for the Web and E-mail that translates English into Japanese. We opened our Web site for public viewing in early January 1995. Since then the Internet has been our primary marketing tool. We sell both our software and services over the Net.



The Internet has completely opened up our ability to reach prospective customers and for them to reach us. In fact, it has helped us increase our customer base to the many thousands.

GLENN AKERS, PRESIDENT
LANGUAGE ENGINEERING CORP.

"IT USED TO TAKE THREE DAYS AND \$50 TO SEND DATA TO MY BUSINESS PARTNER IN JAPAN BY COURIER. ON THE INTERNET, I CAN SEND THE SAME DATA BACK AND FORTH, IN REAL TIME, FOR THE COST OF A LOCAL PHONE CALL."

But you know, the Internet is only as good as the service provider you're hooked up with. We started with PSINet[®] and we stayed with them. Professionalism had a lot to do with us choosing PSINet -- they didn't forget about us once we gave them our business. Also, they offered us the best products, support and price. Right now we deal with Japan a lot, but we're planning on going into other countries. PSINet is really going to help us there because of their global network.

Another extra bonus PSINet offers is this. One of the products they offer besides InterFrame[®], which is our corporate connection, is InterRamp[®].

When we go to Japan, InterRamp allows us remote access through PSINet's global network. All we have to do is call the local number in Tokyo and that gives us our connection to the Internet and a connection back to our office.

There are lots of providers out there, and we could have gone with any one of them. But, when you find something that works, you stick with it. And for us, PSINet works!"



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Language Engineering Corp. can be found at www.lec.com.

Have you ever shown the Web to someone who doesn't know much about the Internet? You ask something along the lines of, "Hey! Want to see something really cool?" and show them, say, the Razorfish site (<http://www.razorfish.com>).

At this point, the neophyte turns to you and says, "So what?"

This disappointing, and all-too-common response reveals a very important issue. By most standards of the commercial marketplace, the Web is . . . er . . . well . . . lame.

Think about it. The Web is a new medium that sits at the end of a chain of more than 25 years of computer development. It has been hyped more than the Wonderbra, received almost as much attention, is now featured in advertising from just about every company in any marketplace, and yet it has less sizzle than the Saturday morning cartoons.

The sizzle hurdle

The puzzle is how to gain sizzle without requiring more bandwidth between the Web servers and clients. You see, it's simply not practical to employ the most compelling data types without a big, fat data pipe. At the line speeds available to most people, audio data sounds like bad AM radio transmissions and video becomes a five frame-per-second, postage-stamp-sized joke that you spend forever downloading.

There's another problem with limited bandwidth: interaction between the Web client and server – say, the submission of data in a form – becomes painfully slow when the data is incorrect. A user who fills in a field with a value that's too high or doesn't have enough characters has to wait around while the incorrect data is sent to the server, the server analyzes the data, returns the response and reevaluates the next round of input.

But what if you could make the browser on the user's end smarter? What if the browser could add sizzle to graphics, do animation and validate user input? In short, what if it could handle all the things that make for a good, no, a great presentation?

Enter Java

The concept of Java is simple: Create programs that can be downloaded from a Web server and run on the client to create the sizzle. For example, the downloaded program could animate a presentation or serve as a smart form that a customer can fill out to order products. If the customer enters incorrect information, the program would immediately catch the error and prompt the user for changes.

Java is both a programming language and an application run-time environment. The Java language itself is a lot like C and compiled Java programs are called applets – an unfortunate term that leads to endless confusion with computer neophytes who think Apple Computer, Inc. is somehow involved.

Java is being hailed by many pundits as the next great iteration of Web technology. Judging by the number of companies jumping on the virtual bandwagon to support Java, they may be right this time.

But, curiously enough, the Web wasn't the original target for Java.

In 1990, Mountain View, Calif.-based Sun

Microsystems, Inc. began working on a language for computer-controlled consumer devices – such as cable television boxes and smart remote-control devices. The goal was to create a language that was small, fast, platform-independent and appropriate for developing user interfaces and control functions for consumer electronics. The result was a language called Java. (Note: The name "Java" has no meaning. It's just a name.)

Java was first incarnated as something called the Green project, an experimental environmental control system embodied in a device called the "7" (pronounced "star seven"). No commercial hardware ever emerged from the project, but the Java language did anything but die.

Serving Java

By 1993, the Web had become conspicuous as a new way of distributing information and the Java development team realized that opportunity was calling. They saw that Java's inherent features made it an ideal language for programming on the Web.

Java applets are downloaded from a server and then executed by the client browser either through a Java interpreter built into the browser or by a helper application. For example, RealAudio data is handled by browsers using the RealAudio Player.

Sun started by offering a browser with internal Java support called HotJava, which was actually written in Java, that is now available on a range of platforms, including Sun machines (no surprise there) and Microsoft Corp.'s Windows NT. Apple Macintosh support is due soon, and with a little luck, it will be available by the time this article runs.

But Java really took off when it was licensed by

Netscape Communications Corp. for Version 2 of its Navigator browser. Others have picked up on the market potential of Java, including a slew of start-ups and small software houses that are planning Java-related products.

Borland International, Inc. now offers a section of its Web site (<http://www.borland.com/Product/java/java.html>) as an information resource for programmers to support the planned release of Latte – a high-performance set application development environment for creating Java applications.

But perhaps the largest claim-staker so far has been Microsoft. In its December Internet positioning announcements, Microsoft revealed that it had

licensed Java from Sun and promised to incorporate Java support in its Internet Explorer browser, along with support for its own Visual Basic Script language.

Combine the marketing power of the Java licensees with the ubiquity of the Web and the open nature of the Java system and you get a pretty bright picture of Java's future.

Wake up and smell the code!

But what exactly is Java?

Well, Java is a language with strong similarities to C++, as well as attributes of Pascal and Modula-3. It

omits features of high-level languages that Java's creators felt were superfluous. For propeller heads, that means features such as preprocessor support and header files, operator overloading, pointers, structures, unions, multi-dimensional arrays and implicit type conversion.

But that doesn't mean Java is deficient in any way. In the recently released, and very good, book, *Hooked on Java* (published by Addison Wesley), the Java development team describes Java as "simple, object-oriented, statically typed, compiled, architecture-neutral, multithreaded, garbage-collected, robust, secure and extensible, and well-understood."

They go on to add that "Java is fun!" But there may be just a tad of bias in that.

It's not that Java programming is hard, but the language has some wrinkles to it that may require a moderate learning period.

There are aspects of Java that will irritate experienced programmers accustomed to object-oriented languages such as C++. For example, Java is more restrictive because it only supports single inheritance. Also, simple data types are not treated as objects.

WAKING UP TO java

It's gotten more ink than the budget crisis, but just what is Java and—more important—how can it help your on-line business?

By Mark Gibbs



That said, the differences aren't insurmountable, and a C or Pascal programmer will be able to write effective code in short order.

Creating an applet involves writing the source code and compiling it using the Java compiler (written in, guess what? Java). The resulting applet is called a class file, thus applets usually have a .class extension.

For an applet to be used by a Java-enabled Web browser, the class file is retrieved from a Web server or loaded from a local file. For example, an applet called Blink – which, not surprisingly, displays blinking text – can be downloaded to make a flashy display.

Java can do a lot more than make text blink. For example, applets can retrieve HTML documents and other files from Web servers. They can determine and, to some extent, modify the client environment and manage multithreading. This would allow an applet to manipulate the client's screen and optimize its own performance. Indeed, Java is described as "MP-hot", by which the Java team means

that applets can be efficiently run on a multiprocessor client.

Unlike programs developed in most high-level languages such as C++, Java applets aren't binary code. That is, they aren't programs that are executed directly by the host processor. A Java program is a file of byte codes – pseudo-instructions, if you will – that are interpreted by a Java run-time system, much like a Basic program is.

While there is overhead in interpreting the byte codes, this method has a number of advantages: It makes the applet platform independent, produces relatively small applet files and allows the applet to be verified before execution – an important security feature.

Verification is possible because the applet makes all calls to program sections or services by name, not memory address. If the required services aren't all

within the Java run-time environment or you don't want them to be used, the applet can be treated appropriately: it simply isn't run. This ensures that violations of local security – manipulation, corruption or revelation of local memory or disk contents – can't occur.

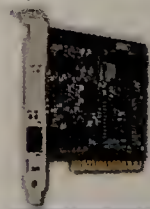
But that doesn't cover all the security features that would allow a user to download and execute an unknown applet with complete confidence. While the

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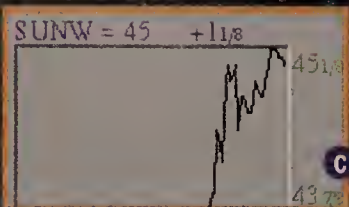
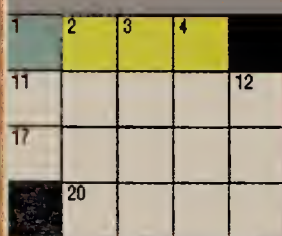
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JAVA at work



1 - across



As these actual examples show, Java applets can be used: to demonstrate concepts, such as how an abacus works (A); provide a framework for interaction with users, like a crossword puzzle (B); or display changing data, such as share/price performance (C).

Java language and applet run-time define a number of security policies, the exact interpretation of these restrictions is vendor-dependent. In the future, we can expect to see a lot of sophistication being added to applet security.

Java-powered

So what can you do with Java?

Demonstration applets that can be found scattered across the Web show lots

of creative ideas, including animations of graphics and text, calculators for general purpose and specialized applications (such as mortgage interest), and sophisticated user interfaces. There are also applets that display line or bar graphs and charts, present scrolling LED-type marquees, manipulate wire-frame and

Java has captured the imagination of developers and Web site owners.

It promises to vitalize commercial Web sites by giving them real sizzle.

solid models, and display animations. These can all be incorporated into existing Web presentations with little effort.

You can create Web pages that accept, validate and issue complex SQL queries, add intelligence to workflow processes and allow for the manipulation of complex virtual reality models.

The answer to the question is that Java can pretty much do anything you can think of, except where you are restricted by Java's security system.

Today, you need a fairly powerful platform to achieve reasonable performance, such as a 75-MHz 486 machine with 16M bytes of RAM running Windows 95 or Windows NT.

There are also few browsers that support Java. Even Netscape's attempts at Java support – available in its Windows 32-bit 2.0 beta releases – don't run reliably.

To get around this, Netscape has introduced a variant of Java called JavaScript. JavaScript is a limited and simplified version of the Java language used as in-line scripting in HTML documents. This makes developing Java-type code much easier and allows the script to run on less powerful platforms.

The downside is potentially less flexibility – how much less is not yet clear – and, because the script is in plain text, you reveal your coding effort to the world for nothing.

Not to worry, though. Java has captured the imagination of developers and Web site owners. It promises to vitalize commercial Web sites by giving them real sizzle – the kind of functionality that will make neophytes look at Web sites and say "Wow!"

If you want to build one of tomorrow's cool and business-effective Web sites, now's the time to wake up to Java. ✱

Gibbs is a consultant, writer and an Internet kinda guy based in Ventura, Calif. Write to him at mgibbs@gibbs.com or call him at (805)644-4999.

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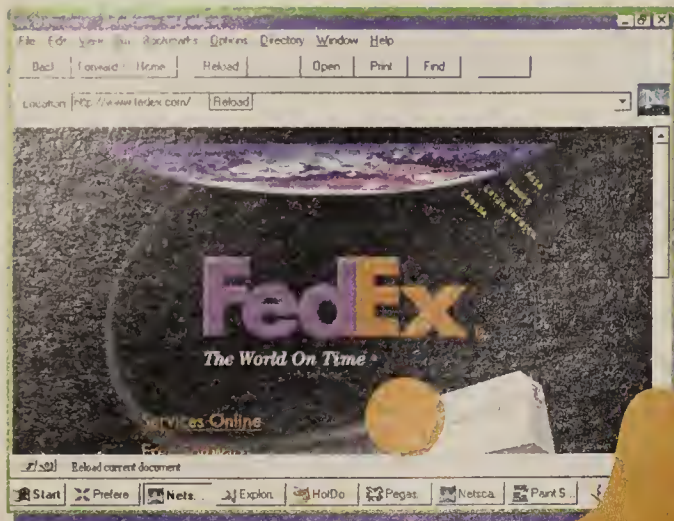
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For more information

- ✱ <http://www.javasoft.com/hooded/> – home of the book *Hooked on Java*
- ✱ <http://www.javasoft.com/> – home of Sun's Java project
- ✱ <http://www.gamelan.com/> – an important Java resource
- ✱ comp.lang.java – a newsgroup that discusses Java
- ✱ java@java.sun.com – where to send inquiries about Java

Recommended reading: *Hooked on Java: Creating Hot Web Sites with Java Applets* by Hoff, Shaio and Starbuck. Published by Addison Wesley, 1995. ISBN 0-201-48837-X.



Fedex home page

On this site, a simple form allows you to find out where your package is in the Fedex shipping system. This site shows how customer service can be simply and effectively supplied. Fedex is taking advantage of a Netscape-specific feature that allows you to specify the background color, as well as the colors of followed and unfollowed links. Most other browsers use only a default or user-configured color.



Clement Mok Designs home page

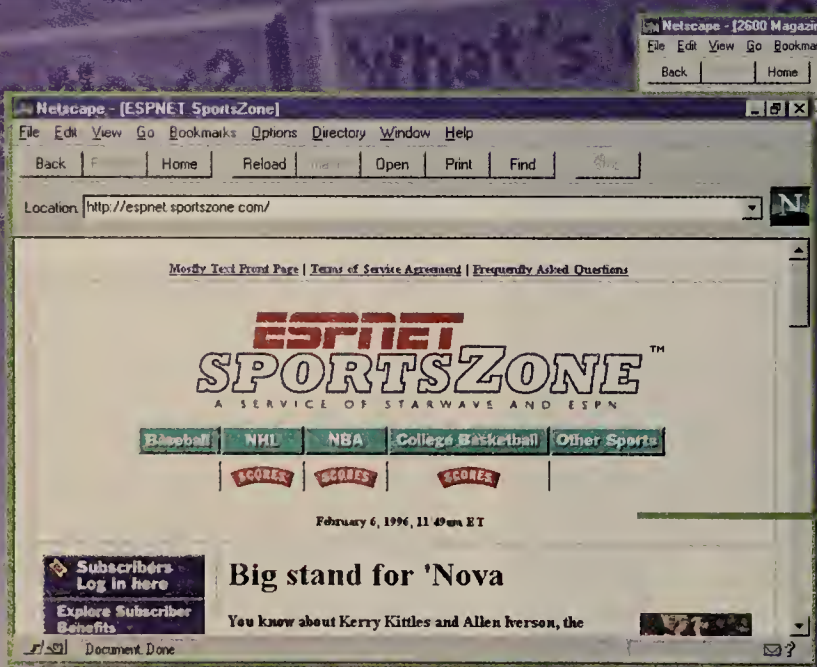
If you've still got those red and green glasses that you wore to see "It Came from Outer Space," CMD offers a number of stereograms that allow you to see objects in glorious pseudo-3D. CMD has created some excellent site designs. Note the clever incorporation of a TV set display in the corner that is fed by Netscape's server-push feature. While not providing real animation, the TV enlivens what would otherwise be a professional but static page.

Site.

seeing

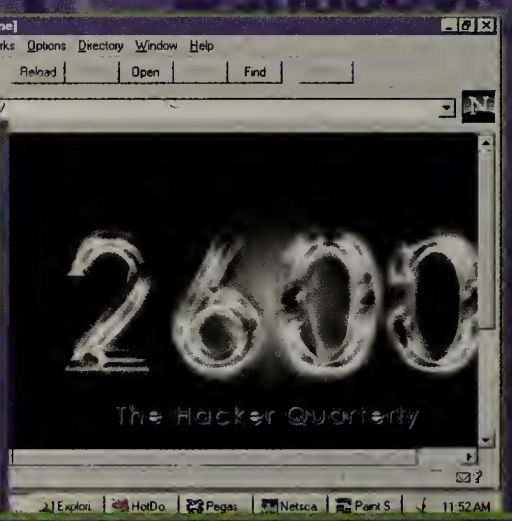
A VISUAL GUIDE TO WHAT WORKS ON THE WEB

By Mark Gibbs



ESPN Sportszone

ESPN Sportszone is one of the 'Net's most popular sites. ESPN's strategy is a simple one: provide lots of useful content to attract lots of users and justify its advertising rates.



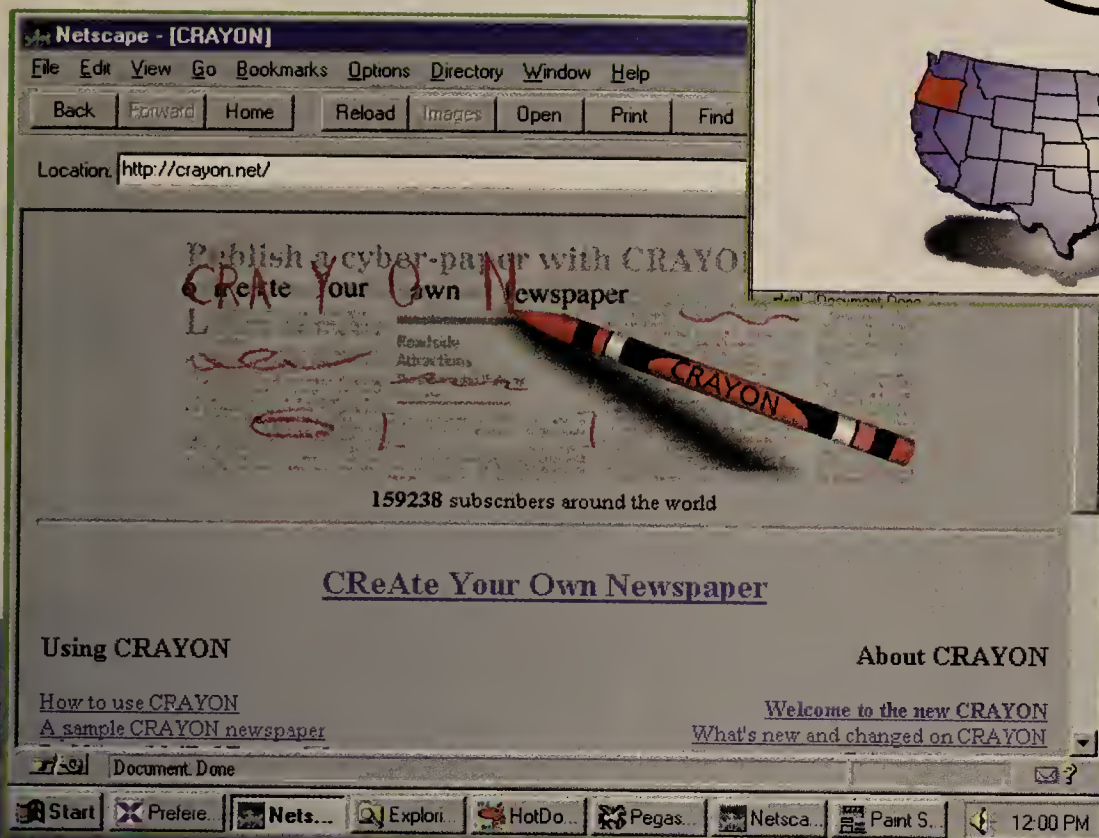
2600 (The Hacker's Quarterly)

The magazine 2600, subtitled The Hacker's Quarterly, has spawned its own Web site. The graphics are a little weak but if you're a hacker or someone who wants to be aware of what they're up to, this is a good site to check out.

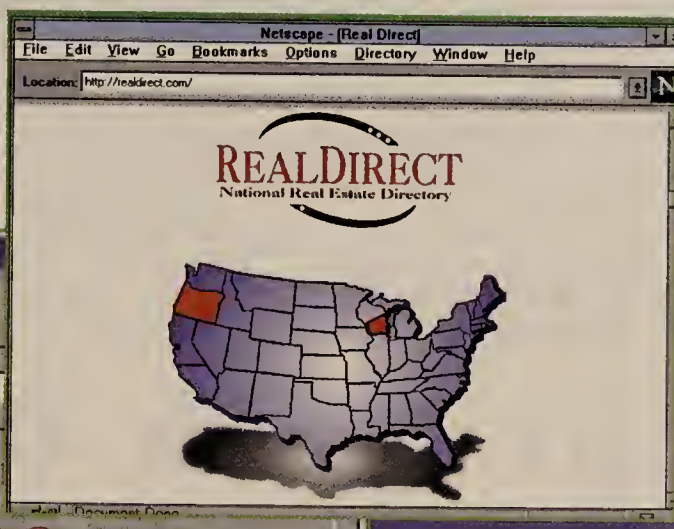


Yahoo!

Web search engines play a key role in making it easy to find what you're looking for. Yahoo! is arguably the most structured, while Digital's Alta Vista is the most comprehensive. If you want to search the newsgroups, Deja News is the place to go. Lycos is another huge database — though somewhat smaller than Alta Vista — and has better searching features.

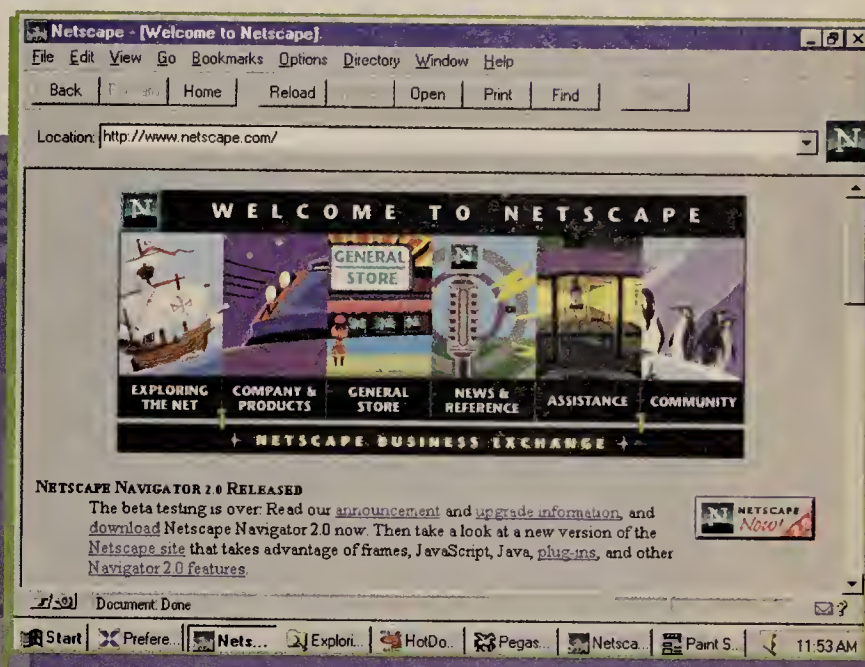


Create Your Own Newspaper (CRAYON)
From *The Wall Street Journal* to 2600, publishers of all sizes are experimenting with the future of their businesses. CRAYON lets you select what news you want to access and produces a Web page which links to Web resources owned by other organizations. Very creative and worth trying.



Real Direct

Another natural for the Web: Real estate. Given the demographics of the average 'Net user and the database nature of realty data, there's little doubt that realty is going to become a huge Web business. Note the simple but effective use of a clickable map of the U.S. to make drilling down into the database simpler.



Netscape

Netscape is the key vendor on the 'Net... for the moment. Its browser, Navigator, supports a range of advanced presentation features that extend HTML in ways the commercial market wants it to go. But its proprietary extensions may not be too durable in the market. The Netscape site is worth checking for clues to the direction of the Web market.



Open Software Foundation's Java/Hot Java Project
Sun's Java is becoming the darling technology of the 'Net (see "Waking up to Java" on page 25). The range of resources and tools for this new, and largely unproven, technology is incredible. It's likely that Java and its offspring, JavaScript, will become permanent features of the Web.



Internet Underground Music Archive (IUMA)

The entertainment industry has jumped on the Internet and Web bandwagons with incredible enthusiasm. Among the earliest and most successful entertainment-oriented sites, IUMA relies on huge graphics to build its image.

Sticking Your Neck Out

We focused on a key question in this issue

of *Capitalizing on the Internet*: Which companies and technologies are going to control the Internet market?

This is a thorny topic to analyze, and a dangerous and career-threatening adventure for network executives charged with bringing their companies onto the Internet.

Therefore, I recommend that we stop sticking our neck out.

You see, if we all refuse to get sucked into the who's-the-right-horse, who's-got-the-best-jockey routine and stop spending money, then the market will slow down. Then we, the folks with the big bucks to spend bringing our businesses on-line, can set up committees to carefully select protocols and standards that fit our business objectives better than the wild experiments dreamed up by deranged students in the dorms of MIT.

We'll get a chance to actually test these products over timescales that are really meaningful. No more of that install-a-beta-a-day routine. Twenty-four hours – or for that matter, 24 days – is simply not enough to test a product if we're going to use it to support our businesses. (Has there ever been a market where software churn was so much a part of business?)

If we push hard, we can get government legislation to back us up. Perhaps we could call it the Electronic Commercial Reality And Protection Bill, or the E-CRAP Bill.

No more launching an Internet product because the vendor thinks it's a "good idea" . . . try it and you're in trouble, buster.

Just think, if we'd had this in place a few months ago, when Netscape brought out its Navigator 2.0 beta release with the nonworking Java support and that depressing habit of executing the crash-and-burn instruction at random intervals not exceeding 20 minutes, we could have hauled Marc Andreessen into court and sued his butt off. ("Sorry, Marc, but you'll just have to sit in that cell until Navigator runs without crashing for at least 30 days. It's for our own good. Oh yeah, and drop that stupid Mozilla stuff – no one thinks it's funny. You won't?! Just gonna have to stay in there then.")

Once we had such a program started, we could extend it to other areas of computing. This is eminently reasonable, as the line between Internet software and hardware and the rest of what we are pleased to call the computer market is getting increasingly blurred.

We could force vendors to pay fines when you call for support and the problem turns out to be their bug! All the big vendors would probably be out of the business software market in a few months, and most of the Internet product vendors would disappear overnight.

We could then aggregate their remains into a government division, perhaps the Department of Software and Hardware Integration and Technology – a name that should never be turned into an acronym.

The department would eventually handle all types of computing products. It would, of course, operate in timescales that approximated geological epochs,

spend millions on the promotion of software that no one wanted, and be incapable of articulating its development and marketing strategy. A lot like the old IBM in fact. But I digress . . .

Of course, we'd have to face up to the consequences of this strategy:

Consequence 1: The rate of novel software and hardware introductions will slow to a trickle. This will reduce the amount of reading and research that you need to do, and you'll not have to worry again about your boss throwing you one of those "What do you think of [product name you've never heard of]?" in a staff meeting. This will be good.

Consequence 2: As a result of Consequence 1, the entire, currently uncontrollable surge of Internet product proliferation and of the Internet itself will slow way down. We won't have to keep hearing that continuous stream of Internet growth statistics ("Did you know that gerbil-breeding newsgroups are growing at five billion percent per hour?"). We won't have to keep checking out the "kool" Web site du jour, which is always just another loathsome, boring, mindless piece of self-promotion by some nitwit who wants to show us his pet iguana. This will be good.

Consequence 3: Our ability to conduct business will stay roughly where it is today. No instantaneous funds transfers, no hugely discounted catalogs because of the cost advantages of being on-line and a slowing down of the availability of cheap communications. This one could swing either way. For MIS: good (less work, less hassle, less headaches); for sales: bad (increased costs, poorer market communications, less opportunity to address new markets).

Consequence 4: Europe, Asia and the rest of the world could dominate the Internet. Without the U.S. pushing the boundaries of what can be done and how to do it, these regions will not have to follow the U.S. and will become increasingly adept in the on-line world. Sure, many of the foreign telcos are to WAN business what Keanu Reeves is to acting (Please refer to my regular back page columns for my insights into this gentleman's dramatic efforts on celluloid.).

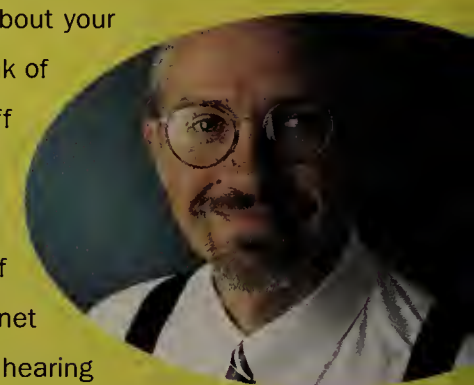
But they will catch up, and if the U.S. isn't leading the way, the opportunity might just spur them on. This will be very bad.

Now, what do we have? Two goods (score 5 for each), one split (score zero) and one very bad (score minus one billion). Total: Minus 999,999,990 points.

Hmmmm. On balance, it appears that for the sake of our very livelihoods we must play the game.

So, which horse to back?

Ah, now there's a question. ✱



Gibbs is editorial director of *Capitalizing on the Internet*, a *Network World* columnist, industry consultant, writer and an Internet kind of guy. Comments, thoughts and horror stories to mgibbs@gibbs.com or call (800) 622-1108.



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*In-Stat, Worldwide Enterprise Remote Access Market Share, 1994

*Dell'Oro Group, Worldwide Remote Node Server Market Share, First Half 1995

*IDC, Worldwide Combined Hardware and Software-Based Remote Access Server Market Share, First Half 1995

SERVER TEST EFFORT TAKES OFF

By
Bill Rinko-Gay

Network World is proud to introduce the first in a series of server tests produced in cooperation with our sister publication, *PC World*. Every month, we will bring several servers into our test center in the Houston area and subject them to a series of tests to determine how well they perform as both file servers and application servers under NetWare 4.1, Windows NT Server 3.51 or both.

All testing is designed and measured from the user's point of view — from the client rather than from the server or network. The measurements focus on the time it takes a user to complete typical tasks — a more useful metric, we feel, than bytes per second or average response times.

Our goal is to make the simulations as realistic as possible without taking the servers to user sites. Therefore, we use real applications to exercise all server subsystems.

In future issues, we'll list a running total of the top five servers in terms of performance and price/performance. We'll also post the results on Network World Fusion, where you can search for the exact server to meet your needs.

We're taking full advantage of the knowledge in the user and vendor community in developing our tests. We've opened our development process to all interested parties, including readers. You can contact me with suggestions at bill_rinko-gay@pcworld.com.

Test center configuration

We use a 100Base-T network in our lab to ensure that there is sufficient bandwidth on the network to support multiple clients. Our 16 client PCs running Windows 95 are based on a 100-MHz Pentium with 16M bytes of main memory and at least a 720M-byte hard drive. Each uses a 3Com Corp. 3C595 PCI-based 10/100Base-T network adapter running Version 5.0 drivers.

To reduce network contention, we use a 3Com LinkSwitch 1000 high-speed Ethernet switch

rather than a concentrator. The switch is capable of providing 10Base-T connections to each client and a 100Base-T connection to the server being tested. The hub can support 24 clients on a single segment. As many as four LinkSwitch 1000s will be connected to the server, each on its own adapter, depending on whether we are testing an enterprise or workgroup configuration.

For our server software, we ask vendors to preinstall both NetWare 4.1 and Windows NT 3.51 on the servers being tested.

How we test

Each test is scheduled by a program called the Load Manager, which displays all the results when the tests are complete. Overall performance is calculated by taking the elapsed time from the beginning of the first test to the end of the last test to ensure that even the I/O caused by Microsoft Corp.'s Microsoft-Test is included in the result.

Instead of file throughput, we measure script throughput, where a script is a set of commands run within an application. In the file server test all the commands executed by Word for Windows make up one script, while the commands executed by Lotus Development Corp.'s 1-2-3 make up another. The test measures the total number of scripts completed by all nodes and determines the elapsed time of the test. This produces a result that can be measured in scripts per minute. A higher result denotes a more productive network session and a faster server.

Once we determine the score for a single client, we run the test on two, four, eight, 12 and 16 clients, all connected to the same hub, with the hub connected to the server by a single network interface card (NIC). For the enterprise case, we use four of these network segments, each on its own hub connected to the server by its own NIC. Using four hubs on four NICs stresses the bus design of the enterprise server for handling multiple devices.

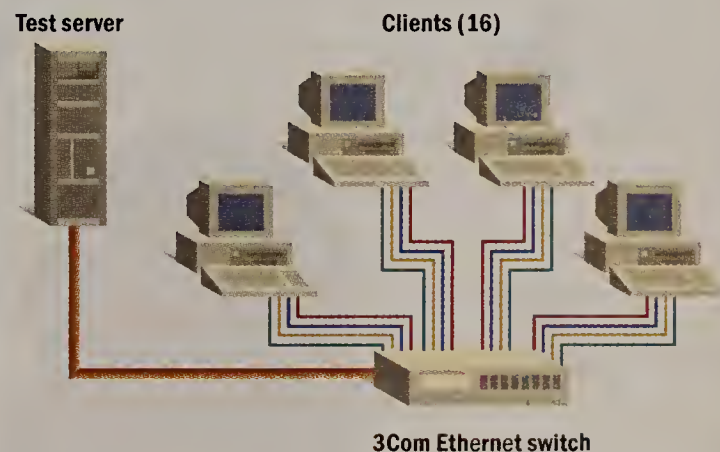
The test is designed to avoid situations that have all clients performing the same functions at the same time. Such synchronization would create an unrealistic scenario that would either benefit a file-

caching architecture on the server or create unreasonable file access conflicts. Though their script orders are all different, clients run each script to ensure that variations in client architecture are not artificially skewing the results.

When all clients load their software from the same directory on a file server, the server can maximize its use of internal cache. When all clients have separate software directories, the file server cannot effectively utilize its internal cache. In our testing, each client has a separate data directory. For the workgroup case, all clients use the same software directory. For the enterprise case, an equal number of clients on each of the four segments share the same software directory. This lets us strike a balance between real-world and ideal operations.

We record data points for each workload that we test. We then graph overall performance as a function of the number of clients supported. We also look at statistical data, such as the maximum and minimum performance measured, and various degradation levels.

SERVER LAB CONFIGURATION



Our server testing lab runs scripts on 16 clients connected to a 3Com Ethernet switch. We connect our test servers to the switch via a 100Base-T adapter provided by the server vendor.

File server test

Our file server test is designed to tell how fast the server can run in an I/O-hungry environment, and how many users it can easily support. We measure performance at several client workloads to help you answer the following questions:

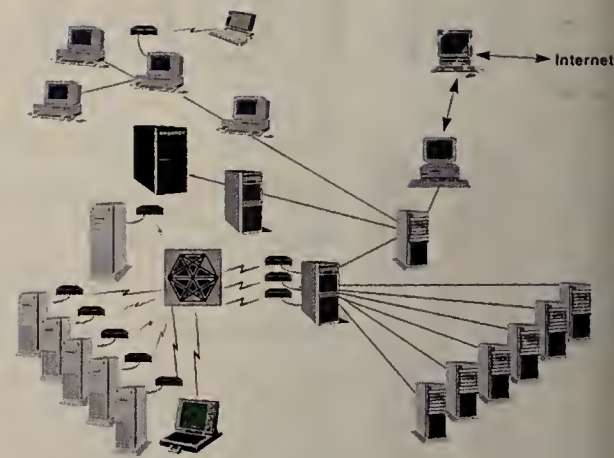
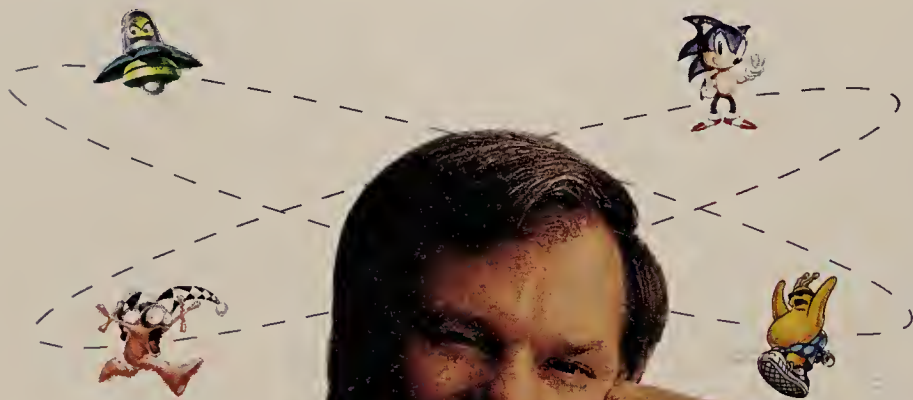
- How fast can the server run the tests?
- How many users can it support at maximum speed?
- How does performance change with workload?

Our file server test is based on four of the applications included in *PC World's* WorldBench test. We modified the application scripts to remove portions that do not access the hard drive and to add I/O-bound activities. This led to scripts that primarily load and save files. We changed the working directories to point to the network drive for both data and applications. Unlike some synthetic

Continued on page 42

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SERVER TEST SERIES

Continued from page 39

benchmarks, this produces the same block sizes for network traffic as the applications do on a production network.

We use a mixture of I/O-intensive applications so the results do not favor one type of application or programming. Though it is impossible to measure peak file throughput in this kind of environment, the benefit of measuring real-world behavior outweighs that sacrifice.

The following describe each of the application scripts used in the file server test:

- Microsoft Word 7.0 for Windows 95 opens several files. First, it imports some clip art into a 50K-byte file. Opening a second document, Word cuts some text, pastes the text into the first file and saves both. Finally, a pair of files, one 43K bytes and one 645K bytes, are opened and saved under a different name.

- Lotus 1-2-3 for Windows Release 5 loads several large worksheets and saves each under a different name. The files range in size from 110K to 153K bytes.

- Microsoft Excel for Windows 95 opens several large workbooks ranging in size from 160K to 827K

bytes. One of the files is used to make a bar chart, which is then manipulated into several chart formats. Each workbook is saved under a different name.

- WordPerfect for Windows is used to open two documents and copy a section of text from one to the other. Then both are saved under different names. The final document is loaded and saved under a different name.

The file server test is divided into scripts for each application. Each of these scripts runs in the application's scripting language. However, the scripts are initiated and timed using the MS-Test facility. MS-Test loads the application, waits for its completion and calculates the elapsed time for the application. There is a specific MS-Test module for each application.

Application test

The second kind of testing we do measures a server's suitability as an application server. To test enterprise-level application servers, we developed applications that behave as if they were mission critical, while we used simpler applications for work-

Avoiding bottlenecks

There are many areas of system interaction in a network that can cause bottlenecks. A bottleneck is defined as a system component that lacks sufficient performance to keep the rest of the system fully utilized. For example, a storage subsystem that cannot supply data at a rate sufficient to drive all the network adapters would be a bottleneck. However, if the disk drive, network adapters and processor were all running at 100% utilization, there would be no bottleneck—just an insufficient server.

The primary bottleneck in most network systems is in the clients, if you don't consider the speed of the user to be a bottleneck. Only recently have 32-bit protected-mode drivers been available under Windows NT and Windows 95. The common 16-bit real-mode drivers create a good deal of software overhead on the clients, preventing them from fully utilizing available network bandwidth.

In addition, client network adapters need to have a high-speed connection to the processor and main memory. The best choice is 32-bit bus-mastering PCI adapters. These have sufficient capability to meet the most demanding I/O situations the clients can provide.

Next, the switch, hub, concentrator or router needs to be evaluated. Ethernet's carrier-sense multiple access with collision detection (CSMA/CD) is an inefficient method for making a connection between client and server. Simple concentrators provide CSMA/CD, which limits you to no more than 30% of the available bandwidth of your network with multiple clients.

With multiple active clients on the network, the hub needs to be able to buffer requests, provide intelligent switching and offer high-speed access to the server. In a larger network, ineffi-

cient routers also create a bottleneck that might be blamed on the servers.

The server itself needs at least one 100M bit/sec network adapter with high-speed access to the CPU and memory. It should be a bus-mastering PCI adapter on a well-designed PCI bus. With multiple adapters, the PCI bus needs to be able to handle high-demand I/O while still allowing the processor or processors to operate without incurring wait-states. Most PCI buses are not designed to optimize concurrent operation of devices and memory. A well-designed PCI bus is a must on a power server.

Finally, the storage subsystem is important. We use the term "storage subsystem" because it incorporates more than the hard disk. Multiple hard disks in a single storage volume is a more efficient solution than a single hard disk because data striping allows slow-seek operations to be performed concurrently with transfer operations, improving overall access time. Likewise, multiple controllers improve performance.

In addition, the server's cache memory is critical in overall performance. The larger the cache, the fewer accesses to the slower hard disks and the faster the server. And, of course, server processing requires plenty of main memory, especially if the server is an application server.

We recognize that some vendors offer ways to configure storage subsystems to protect data from hardware malfunctions. This feature may be valuable to many of you. However, it will either reduce performance or available volume. To test some servers with protection and some without could create a misleading, unfavorable impression of the servers that offer the feature. Therefore, we test without data protection features enabled.

ProSignia 500 Model 5/120-2100

VENDOR: Compaq Computer Corp.

CONTACT: (713) 370-0670

PRICE: \$5,622

PERFORMANCE RATING: 32.2



Note: A lower price/performance index indicates better value.

WORTH NOTING

The Compaq ProSignia demonstrated good, scalable performance in our tests.

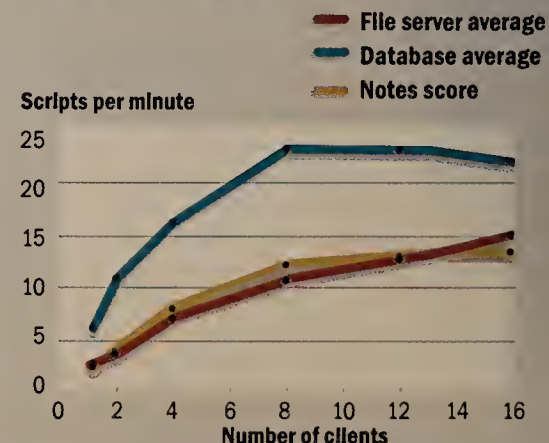
Designed to be a workgroup server, its tower case is roomy enough for a few additions, but clearly not designed for space-eating SCSI drive arrays or multiple processors. The power switch is covered by a clear plastic bubble with holes through which you poke an instrument to turn the machine on or off. While this prevents accidental shutdowns, it's a bit of an annoyance when the time comes to power-cycle the machine—especially since Compaq still doesn't provide reset buttons on its equipment.

The side panel pulls off after removal of three thumbscrews to reveal a system configuration sticker that clearly marks component locations in line drawings, and includes information on what options can be purchased for the machines, such as hard drives and memory. The four 3 1/2-inch hard-drive bays are easily accessible and removed. Add-in card slots are also available. The 5 1/4-inch drive bays, however, require a tool to access. The SIMM sockets are positioned directly under the 3 1/2-inch bays, making access difficult without removing the processor card, although the card is simple to remove.

Compaq provides SmartStart, a set of CDs and a licensing diskette, which allow you to easily install Novell, Microsoft, SCO, IBM and Oracle system software.

The first CD is bootable, a powerful innovation since you can't destroy your CD-ROM drivers and make the CDs unusable. Another bootable CD provides support software.

PERFORMANCE SUMMARY



NetServer 5/133 LH

VENDOR: Hewlett-Packard Co.

CONTACT: (415) 857-1501

PRICE: \$8,229

PERFORMANCE RATING: 38.6



Note: A lower price/performance index indicates better value.

WORTH NOTING

The HP NetServer 5/133 LH is, overall, an impressive unit that demonstrated good scalability, especially in our database tests.

Its front case appears divided in half. On the left are cooling vents, switches and LEDs. On the right is space for six hot-pluggable drives, with four installed in the unit we tested.

Inside, there isn't much wasted space; the system board exactly fits the space available. However, it's easy to move around the inside — very serviceable.

This NetServer uses four drives and two controllers, with data spanning the drives and controllers — hence the excellent performance.

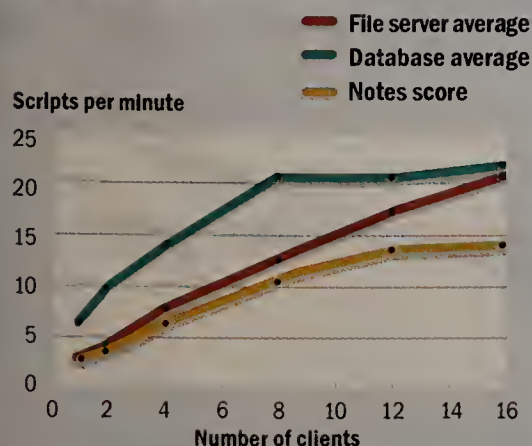
The server used all four drives on both controllers to implement software RAID 0, without any hardware RAID controller.

A bootable quad-speed CD-ROM drive has an EISA configuration program, HP drivers for various network operating systems (NOS), a utility to show configured cards, a utility to configure a hardware disk array, software to configure add-in cards and the ability to create diskettes for any drivers.

There are also NOS installation tips and HP NetServer Assistant, an OpenView-compliant server manager that ties the server into a Simple Network Management Protocol management system.

Except on the CD-ROM, the documentation is somewhat sparse. We never found details on the performance of the hard-drive subsystem, maximum RAM capacity and most of the other configuration items we care about.

PERFORMANCE SUMMARY



group application servers.

The application test measures client response running Lotus Notes 4 and Microsoft Access 95. Both applications run out of directories on the client's hard drive. The servers run Notes 4 and Oracle Corp.'s Database 7.2. Microsoft Access uses Intersolv, Inc.'s 32-bit ODBC Driver Pack to connect to the Oracle database engine on the server being tested.

The first application uses two applications from GroupQuest Software, Inc.: HRQuest and Client Tracker. One copy of each database exists for a view test, and all nodes share the same copy. The view test selects each view from the database and selects each document from the view. For the insert test, each node has a copy of the database in a private subdirectory on the Notes server, and loads several input records to the database.

This arrangement produces four scripts — two each of the view test and of the load test. As with the file server test, we report the results in scripts per minute.

The second application is a client/server database using the Oracle Workgroup Database 7.2 on the back end and Microsoft Access 7.0 on the front end along with Intersolv's ODBC Driver Pack to access Oracle on the server. This means that our entire path to the database engine is a 32-bit path. In the workgroup case, the database consists of three tables joined together emulating typical pay-

roll management functions: giving each employee a raise, processing the week's payroll, running various reports and so on.

In the enterprise case, the database simulates a large-scale decision-support system. There are tables with product forecasts, bill of material lists, component commits and manufacturing run rates. These tables are used to provide what-if reports concerning possible component shortfalls, manufacturing bottlenecks and forecast inaccuracies.

Both tests measure the number of scripts performed by all clients during the test. Note that we are not measuring transactions per minute, but functions per minute. There are many transactions in each function, and the transactions are not all the same.

Our performance rating is derived by adding the file server performance in scripts per minute to the average of the two application server results, from the database and Notes tests, at the 16-client level. We then divide the price of the server as tested by the performance rating to get our price/performance index. ■

Get the complete results of our server testing on Network World Fusion. Select NetRef, Buyer's Guides and Reviews, then Servers.

<http://www.nwfusion.com>



THE INSIDE STORY

Model	ProSignia 500 Model 5/120-2100		NetServer 5/133LH	
Processor	Intel Pentium, 120-MHz, 256K-byte L2 cache		Intel Pentium, 133-MHz, 256K-byte L2 cache	
Memory	As tested		As tested	
	32M bytes		32M bytes	
Maximum	144		192	
Bus	EISA/PCI, Compaq Tri-Flex PCI chipset			
Slots	Provided		Provided	
	Open		Open	
EISA	3	3	4	4
PCI/EISA	1	0	1	1
PCI	1	1	4	3
Processor	1	0	1	0
Total	6	4	10	8
Bays	Provided		Provided	
	Open		Open	
Four 3 1/2-inch internal	3		Six hot-pluggable	2
Four 5 1/4-inch front panel	2		One standard	1
Total	8	5	7	3
Storage				
Adapter	Integrated 32-bit Fast-SCSI-2/P		2 embedded Adaptec AIC-7870 Fast/Wide SCSI-2	
Bus	PCI		PCI	
Capacity	2.1G bytes		4.2G bytes	
Model	Seagate Barracuda ST32235		Seagate ST31230WC	
Average seek time	9.5 msec		Not available	
Transfer rate	10M byte/sec		Not available	
Maximum drive capacity	Internal		Internal	
	30.1G bytes		29.4G bytes	
Network adapter	External		External	
	240.8G bytes		146G bytes	
CD-ROM	Compaq NetFlex 3P with 10/100Base-TX UTP module		Cogent EM110 TX	
Fault tolerance features	2x tray load, bootable		4x bootable Sony CDU-76S	
	Dynamic sector repairing with drive parameter tracking SMART controller, RAID5 with SMART SCSI array controller, ECC memory		ECC memory, hot-swappable storage, automatic server restart, temperature monitoring, optional Remote Assistant card for remote server management	

Countdown

By Ira Brodsky

With a revolving door of mobile data vendors and products, some wireless network services years behind schedule and a dearth of users, you have to wonder: Has mobile data officially flopped?

Hardly. While mobile data's ramp-up has been painfully slow and the market still has to free itself from some stifling conditions, substantial progress is being made. The countdown to success has begun.

Millions of notebook computers are being equipped with cellular-ready modems. Two-way paging service has arrived. Cellular Digital Packet Data (CDPD) networks are finally rolling out, albeit after long delays.

Dual-purpose modems supporting both wire-line and wireless connectivity are now available. And software designed to exploit mobile access to on-line networks — particularly the Internet — has become a cauldron of development activity.

You can read about many of these developments in the pages that follow. Still, where are the users?

Even the most sanguine estimates peg the current U.S. mobile data market at about half a million subscribers. In contrast, there are more than 28 million cellular telephone users, and their ranks continue to swell.

So far, mobile data has found success almost exclusively in a small group of industries: field sales and service, public safety and utilities.

For example, most everyone is familiar with the success stories of FedEx and United Parcel Service of America, Inc., which use mobile data to track packages as they wend their way from shipper to recipient. Anyone can track shipments by calling the courier's customer service line, and both firms permit customers to obtain this information via computer hookup.

But these stories, so far, are more the exception than the rule. Why?

FIVE MYTHS OF MOBILE DATA

Reasons — or, in most cases, excuses — for mobile data's disappointing growth abound.

Myth #1: There are too many mobile data choices.

It's true that as markets mature, there are sometimes vendor shakeouts that greatly simplify purchasing decisions. But choice has never been an impediment to market growth. PCs, LANs and long-distance telephone services are just a few examples of markets in which customers manage to spend their hard-earned money despite a dazzling and often confusing array of choices.

People buy products and services to solve their problems or empower them in important new ways, not when the number of choices falls below some arbitrary threshold.

Myth #2: Customers are waiting for mobile data standards.

According to this myth, customers are afraid of losing their investment by selecting the

to mobile blast-off

The mobile data market continues experimenting with creative ways to launch itself into corporate America. But getting mobile off the ground has been no simple feat.

“wrong” technology — one that does not go on to become the industry standard. But there are many markets that have succeeded despite the fact that customers had only competing, proprietary solutions to choose from.

For example, a clear technology winner never emerged in the LAN market, so the industry simply adopted multiple standards and declared victory.

The old Beta vs. VHS battle that dominated the first years of the VCR market often comes up in discussions about the dangers of buying ahead of standards. According to this view, most consumers were unsure which standard would prevail, so they decided to wait. The hapless souls who bought \$1,000 Beta VCRs became victims of market chaos when VHS finally triumphed.

This is bunk. By definition, early adopters are people who are willing to spend more for a product whose future is uncertain because they are convinced it delivers the value they are seeking right now.

Most of the early VCR buyers were gadget freaks or people who wanted to record broadcast TV; standards weren't particularly important. And consumers benefited from the Beta vs. VHS competition because it drove down VCR prices, which in turn led to a huge demand for video rentals.

Myth #3: Mobile data prices are too high.

Special introductory prices and package deals have repeatedly failed to launch the mobile data market. Therefore, we are forced to assume that high prices are not the main problem.

For example, Motorola, Inc. and its network services company ARDIS Co. offered deals throughout the second half of last year on bundles of PC Card modems, personal communicators and airtime. And ARDIS began offering messaging service packages starting at \$19.95 per month.

RAM Mobile Data, a competing carrier, and Ericsson GE Mobile Data, Inc., the primary supplier of equipment for use over RAM's network, have also tried various price promotions with little success.

But no amount of price tinkering is likely to help ARDIS and RAM; their problem is network performance, not price.

Most of ARDIS' base stations transmit at 4K bit/sec, but the average end-user throughput is roughly 1,200 bit/sec, so the service is only suitable for short transactions. RAM's performance is only slightly better. Customers seeking remote access to enterprise networks will never flock to what are, in effect, wireless telex services.

Myth #4: There aren't enough end-to-end mobile data solutions.

It is true there is a dearth of turn-key mobile data solutions, but this is a nor-

mal characteristic of the vertical market growth phase. Besides, having to ride the learning curve and do some customization often are inducements for organizations seeking competitive advantage.

Corporations have never shied away from hiring analysts, programmers and technicians to assemble in-house information systems. And there is no lack of organizations with applications compelling enough to justify the effort.

According to the U.S. Bureau of Labor Statistics, there will be over three million truck and taxi drivers, three million field service technicians, two million public safety workers, and more than five million sales and marketing personnel (excluding retail) by the year 2000, and they could all benefit from mobile data.

Myth #5: Customers are not sufficiently aware of mobile data's benefits.

This is the most lame excuse, usually trotted out by vendors in a state of denial: “People aren't buying my product because they don't yet understand it.”



INSIDE

- Portable hardware. *Page 47.*
- Mobile software. *Page 49.*
- Wireless net services. *Page 50.*
- Integration options. *Page 51.*
- How to contact the vendors. *Page 52.*
- Remote LAN access. *Page 53.*
- Editor's comments. *Page 54.*

Illustrations by James Yang

Get real. Users are deluged with mobile data articles, conferences and vendor information. What is lacking is not awareness, but powerful and simple solutions. Senior management will demand mobile data once it proves it can do the job: network managers will gladly implement mobile data when doing so becomes simple and risk-free.

The biggest obstacle to user acceptance of mobile data — both directly and indirectly — is the performance of existing wireless networks. Throughput is low, response time sluggish and most protocols so arcane they scare away developers.

Software, devices and integration services also have their row to hoe. Mobile-enabled versions of popular programs plus mobile data development tools account for most of the software, but innovative applications are needed to ignite large-scale user interest.

PC Card-format radio modems are emerging but are available only from a couple of vendors. There are even fewer portable devices with built-in wireless data connectivity.

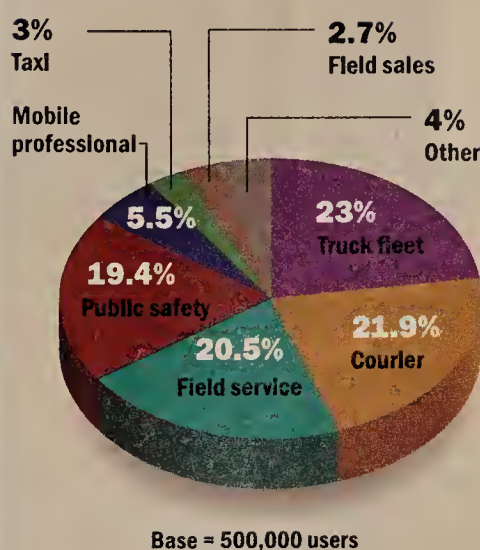
And too many integrators are chasing after the few proven markets. It's time for wireless data to invade industries like health care and education, as well as the Internet.

But services are the glue that binds these other market components. Until you can do anything via wireless data that you can do via dial-up modem, poor performance will be a main inhibitor to wireless data for the masses.

Fortunately, some entrepreneurs have begun to realize that most of today's wireless data networks simply don't cut the price/performance mustard. This is causing the industry to split into two types of networks: low-speed, high-latency nets for messaging and on-line transactions, and high-speed, low-latency nets for remote access to office computing resources.

Customers can only benefit from this situation. They will no longer be sold underpowered services for remote access to corporate resources, and there will be two-way pagers available for messaging and transactions on the nets of estab-

WHO'S USING MOBILE DATA?



SOURCE: DATACOMM RESEARCH CO., WILMETTE, ILL.

lished paging carriers, such as SkyTel Corp.

According to SkyTel, its months-old SkyTel 2-Way net already covers more than 1,100 cities and suburban towns across the U.S.

In addition to progress in the paging arena, the cellular telephone industry has made significant strides in mobile data over the last year. CDPD has suffered harsh criticism for breaking availability date promises and remaining a largely regional service. But it clearly outperforms the services offered by ARDIS and RAM Mobile Data.

More to the point, CDPD is the only one of the three services able to support real-time interactive applications such as browsing the World-Wide Web. This is because CDPD's throughput is qualitatively superior.

And just last month, GTE Mobilnet, a cellular carrier serving about 20 markets, slashed its CDPD prices to undercut RAM and ARDIS by about 75%, dramatically lowering users' cost of entry into wireless data networking.

But CDPD doesn't completely replace circuit-switched cellular for data use. In fact, together, they are a powerful one-two punch: CDPD handling real-time interactive and on-line transaction applications, and circuit-switched handling file transfers. Several companies have worked diligently to improve circuit-switched cellular data's performance and ease of use.

For example:

- Spectrum Information Technologies in Purchase, N.Y., has developed and licenses software drivers that enable PC Card modems to "direct-connect" to handheld cell phones.

- Air Communications, Inc. in Santa Clara, Calif., has developed an integrated modem/cell phone that takes advantage of cellular's signaling channel to enhance data performance, particularly during cell handoffs.

- Celeritas Technologies in Mission Viejo, Calif., is licensing technology that helps overcome the throughput limitations when adapting dial-up modems to

cellular voice channels.

Another wireless service that is certain to offer more robust data capabilities is broadband personal communications service (B-PCS). One B-PCS solution that could help overcome the perception that wireless data is inherently slow is the Personal Access Communications Services (PACS) technology developed by Bell Communications Research, Hughes Network Systems, Inc. and Siemens Stromberg-Carlson.

PACS is designed to offer landline-quality wireless voice and data service in limited-mobility applications. Regional Bell telephone companies such as US WEST, Inc. and SBC Communications, Inc., for example, are testing PACS for outfitting remote parts of their territories with links supporting ISDN speeds of 128Kbit/sec.

Finally, Metricom, Inc. in Los Gatos, Calif., has launched a portable data service called Ricochet, primarily targeting pedestrians in campus environments. Again, Ricochet serves as proof that wireless data can match the performance of the fastest dial-up modems — 28.8Kbit/sec.

Software inhibitors

Much effort has focused on mobile-enabling desktop applications and providing tools to help programmers create applications "dumbed down" to run over ARDIS and RAM nets. Unfortunately, few innovative applications specifically designed to empower mobile users have been introduced.

Most personal digital assistant (PDA) operating systems are mobile communications-centric. But because of problems with handwriting recognition,



What will it take?

The mobile data market requires maturing in many areas before users will buy en masse. Among the top requirements:

No. 1: More efficient batteries. Power could be the biggest remaining obstacle to going totally unplugged. Today, users wanting wireless connectivity have to lug bigger and heavier devices due to additional batteries or they have to put up with reduced operating time.

Compared to electronics, battery chemistry appears to be evolving in slow motion. The long-term solution may be in building radio base stations, wall- or ceiling-mounted infrared access points, and faster networks that reduce transmit/receive time and thus conserve battery use.

No. 2: Better network performance. Existing dedicated nationwide mobile data networks are sluggish and lack capacity. Mobile data will succeed when users can expect performance closer to

battery life and prices, those devices haven't caught on yet (see story, page 47).

The good news is there is plenty of backroom development going on. For example, AT&T Wireless Services in Kirkland, Wash., has developed a protocol for short messaging called Limited Size Messaging (LSM). The firm plans to use LSM with both CDPD and a proposed two-way paging system called Personal Air Communications Technology, or pACT.

LSM could become a common platform for messaging between telephones, fax machines, cell phones, pagers, notebook computers and voice mail systems.

What's a user to do?

Information is vital in today's business world, and wireless lets key people get information sooner. Therefore, end-user organizations must constantly reassess how wireless might be used to improve field productivity or customer service.

The biggest challenge is not letting yourself be lulled to sleep by wireless data solutions that promised the world but fell short. That's yesterday's news.

The new generation of mobile data services is more powerful, easier to implement and more compelling in mission-critical applications. Those who don't want to risk getting blindsided will begin experimenting now with the new cellular data and two-way paging technologies. There are few cookie-cutter approaches in new markets, but here is some general advice to those considering wireless data:

- Look to established industry giants for basic network services. The cellular telephone and paging industries have the time, money and motivation to deliver the services users really want. Then turn to entrepreneurial firms for subscriber devices, software and third-party services.

See Countdown, page 52

Network World has rated the maturity of the mobile data market, its components and the remote LAN access market. Our rating key:

- 1 In development
- 2 Useful in niche markets
- 3 Expanding to horizontal market
- 4 Fairly mature
- 5 Plug and play

Discord in hardwareland

By Tim Schmidt

If past predictions had come true, the streets today would be teeming with millions of field service and white-collar workers toting handheld or laptop computers connected to wireless nets.

Unfortunately, however, many large companies that have conducted in-depth product evaluations over the past several years are still seeking a hardware platform that does the trick for all their mobile workers. Price and features have not yet converged at the right point for most companies. In short, vendors aren't listening to customers.

Users have stated that they are looking for the following:

- Easy information transfer from portable computers to desktops via well-designed docking stations and industry-standard infrared ports.
- Products that vendors are willing to stand behind for the long haul.
- A price that makes it possible to deploy hundreds or thousands of units.

To be sure, some successful field automation projects have gotten off the ground. Still, most potential users are having to wander through a large product offering maze without clear answers about product differentiation and integration requirements.

What's gone down

The lackluster mobile hardware market has suffered greatly from vendor waffling on product commitments. Many top manufacturers have been unable or unwilling to bite the revenue bullet and help grow the market — particularly in the case of handheld computers, also known as personal digital assistants (PDA) or personal communicators.

Cases in point: GRiD Systems Corp., which blazed the trail in laptops and pen-based computing in the late 1980s, is nonexistent. GO Corp. decided that a unique pen computing interface with a paper

metaphor would drive the industry — only to meet its death a few years later.

Even Microsoft Corp. bailed out on its WinPAD PDA, which was to have had seamless connectivity to Windows. Hundreds of developers jumped on the bandwagon to build applications for the product — which never shipped.

AT&T, Compaq Computer Corp., IBM, Motorola, Inc., NCR Corp. and Toshiba America



HARDWARE

Information Systems, Inc. all invested millions in pen computing and PDA projects only to pull out of the market or scale back dramatically.

To achieve the necessary profit margins, these companies had to sell large volumes of computers. Alas, the handheld industries were not mature enough to provide the numbers of units these companies required to meet plan.

All these vendor abandonments have left user organizations ill at ease with the future of any mobile computing device or company they might invest in.

Wireless modems — the communications glue — have also taken their time to mature. Until recently, they were nicknamed “bricks” because of their size and weight. Not surprisingly, most mobile workers were unwilling to carry around a wireless connection that doubled the weight of their device.

Modems to the rescue?

But recent progress with wireless modems may be a harbinger of better times ahead. Wireless bricks cost about \$1,300 until about a year ago. Modems are now being introduced as Type II PC Cards with a price tag of less than \$500. This is a much more palatable price (and form factor), particularly for companies looking to deploy thousands of units.

These new modems also have improved battery life. And functionality has expanded to include connections to at least two networks — such as a standard phone network and a cellular or packet radio net — in one gadget.

These developments are a collective milestone because they address the limita-

tions of human anatomy (size and weight), the restraints of the pocketbook and the human desire for choice.

The user dilemma

Still, corporations looking to implement wireless data are in a quandary. Acceptable portable computer-plus-peripheral price points range from \$1,000 to \$5,000 per user, depending on how critical the mobile application is to the buyer's core business.

But for many users, there is a price-feature mismatch.

Volumes of companies, for instance, have looked at the Apple MessagePad running the Newton operating system. The appeal is its under-\$1,000 price tag and ease of use.

Yet the ability to expand the platform by tagging on other communications links and corporate database connectivity has eluded the unit.

David Greenburg, chief executive officer of Visteon Corp., a company in Maitland, Fla., that develops and sells clinical management applications, said the MessagePad is priced right but has too small a screen for his application.

“When we look at larger units, we find that the price increase is too dramatic,” he said.

At the opposite end of the pricing spectrum are such companies as Norand Corp., TELXON Corp. and Symbol Technologies, Inc., which make ruggedized handhelds. They have concentrated their efforts on vertical industries, such as inventory scanning in retail stores and field sales. They provide complete solutions, including corporate data connectivity in the \$5,000 range.

The vertical manufacturers are producing fewer units with a proprietary advantage — the downside is the heftier price.

But most organizations want to have their cake and eat it, too: They want the integrated approach and other features these companies offer at consumer price points.

Will these two criteria ever meet in one device? There is such work in progress. Some products that at least get close might emerge next fall.

What's hot, what's not?

Coming closest to meeting user demand now are vertical manufacturers such as TELXON and Symbol, which are selling Windows-based hardware with docking stations, tightly integrated wireless options and well-thought-out ergonomics.

The Sony Electronics, Inc. MagicLink — priced at about \$800 — is hot because its two Type II PC Card slots, plug-in keyboard and other peripheral support render it expandable. However, the General Magic, Inc. Magic Cap operating system on which it is based has a vendor of, for now, shaky viability behind it.

Meanwhile, the Dracon Division of Harris Corp. builds test equipment for field telephone technicians, and the company has decided to target that market with an interesting PDA of its own. Harris' SuperTech 2000 is a rugged, backlit, \$3,000 Newton-based PDA. The device is expensive, but Harris has a solid plan for adding third-party communications and applications software.

Until the pieces come together in many devices, the PDA-toting millions will remain a market forecaster's pipe dream. And users will be unable to capitalize on the edge afforded by going mobile.

Schmidt is a principal with Encore Consulting Group, Inc., a Longwood, Fla., firm specializing in field force and wireless consulting. He is a founding member and director of the PDA Industry Association and cochairperson for the Network World Unplugged conference.

A mobile lexicon

IrDA. A standards-compliant infrared data transfer port that can handshake with other IrDA ports for data transmission. Port specifications are set by the Infrared Data Association.

Notebook. A portable computer that usually weighs between 5 and 8 pounds.

PC Card. An industry-standard, credit card-sized adapter that can be used in laptops, PDAs or other portable computers for communications, memory or other functions. Formerly called a PCMCIA card.

Pen-based tablet. A portable computer that is usually the size of a letter-sized piece of paper. Its main method of data input is an electronic stylus that allows the user to write directly on its LCD, which is beneficial to users who need to record inventory and other information while walking. Keyboard options are available on most devices.

Personal digital assistant (PDA). A small handheld computer that is used largely as a personal organizer and for electronic mail. It usually has a pen interface for data input and some also have small keyboards.

Subnotebook. A small notebook computer that usually weighs less than 4 pounds and has smaller-than-standard keyboards.

Sony's MagicLink ▶ is expandable and priced right, but it's based on an operating system with questionable viability.



◀ **Harris' SuperTech 2000** hits the features mark for telephone technicians, but its \$3,000 price tag would turn off the masses.



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Software spins wheels in niche markets

By Karen Scherberger

One reason many enterprises have remained on the wireless sidelines is that mobile-enabling application and communications software has become mired in specialized markets.

The limited choices in application software designed from the ground up for mobile workers have come mostly from niche vendors or from very focused initiatives within user organizations. Dominant client/server application vendors such as Microsoft Corp., IBM/Lotus Development Corp. and Sybase, Inc. have paid only lip service to wireless.

Meanwhile, communications software optimized for wireless connections, known as mobile middleware, is available primarily from small vendors with limited resources. Their pocketbooks force them to limit the devices and networks they will support or to target only specific industries or types of users.

This whole scene has left many enterprises with broad mobile requirements feeling that wireless computing is too risky or immature to invest in. According to Mike Maguire, mobile product analyst with Dataquest, Inc., 11 million laptop computers were shipped worldwide in 1995, and several times that number are in use. Yet less than 1% rely on two-way wireless data networks.

Some tenacious companies have taken matters into their own hands. Yellow Freight System, Inc., a \$2 billion trucking company headquartered in Overland Park, Kan., is one.

"We need to move information faster and more accurately" to improve customer satisfaction, said Chuck Hammeke, reengineering project manager. Yellow Freight is in the testing phase of a large reengineering project that involves mobile data terminals and a combination of packet radio and satellite nets.

But the project has not been easy, and Yellow Freight is writing its own applications. "Whether you're talking about the networks, the middleware or the applications, you still have to invent the wheel," Hammeke said.

Application development worries

Part of the user burden stems from the fact that developing applications for disconnected users requires a mental regression to the pre-Ethernet days of limited

bandwidth. This mind shift is difficult for many developers.

Eric Anderson, technology manager in integrator Andersen Consulting's mobile group, said he believes many developers "don't have respect for the [limited] bandwidth that is available to them" in a wireless environment.

This issue crops up frequently with respect to which networking protocol to use for applications that

will run over new Cellular Digital Packet Data (CDPD) networks: TCP/IP or User Datagram Protocol (UDP)/IP. By offering an added degree of reliability to network connections, TCP can overcome degraded net performance.

But the penalty is roughly 40% more overhead than UDP. This is extra network clutter that CDPD nets, which run at 19.2K bit/sec with an effective throughput of about half that, can ill afford.

UDP, while slimmer, is not typically used in high-profile corporate applications. So using it may require application developers to make substantial changes.

As a compromise, TCP/IP software makers Walker, Richer & Quinn, Inc., Frontier Technologies, Inc. and Trumpet Software, Inc. have optimized their respective TCP/IP stacks to minimize the overhead premium.

Few existing applications have been optimized for wireless. Unfortunately, many of those that have been are horizontal applications that appeal primarily to freewheeling, technically astute mobile professionals and not to large enterprises having to accommodate legions of foot soldiers in field sales or service.

Both RadioMail Corp.'s RadioMail and Wynd Communications, Inc.'s WyndMail wireless mail packages are in this camp.

A typical RadioMail customer is Jerry

Michalski, managing editor of "Release 1.0," a newsletter published in New York. Michalski has a single-user account and relies on RadioMail for on-the-road messaging without having to hunt down a telephone jack.

But Michalski still requires his Internet-based E-mail because RadioMail charges by the packet, making it prohibitively expensive for the bulk of his messages.

Having two mail accounts is unwieldy. Michalski has to "maintain duplicate address books and remember which mailbox contains individual messages I've received."

Another developer focus has been on salespeople. Over the next three to five years, field salespeople will begin to use wireless for such activities as obtaining just-in-time inventory positions when taking customer orders.

They also could use the technology to enter orders and initiate fulfillment processes immediately. However, this will require greater cross-functional integration with back-end systems.

Meanwhile, many more field service, dispatch and delivery companies have come to value wireless networking. A primary reason is that real-time communication is used to continually reprioritize the worker's schedule throughout the day for improved customer service.

The general-purpose communications platform of the future will support these service technicians, salespeople, traveling executives and even customers and suppliers, who will communicate with the enterprise from afar.

The new platforms will support both on-line and store-and-forward communications sessions. Unfortunately, today's communications software is typically designed around one or the other, which forces network managers to buy and support two separate products or settle on one product with one mode of access.

Remote communications products that permit on-line connections, such as Microsoft's Remote Access Server, are better understood than newer store-and-forward products such as XcelleNet Corp.'s

RemoteWare.

As a result, they are often selected as the de facto remote communications method despite the fact that on-line access is more time-consuming and expensive than store-and-forward access.

By 1998, integrated products that deliver equivalent functionality when operating in either store-and-forward or on-line mode will be available.

The single largest and most successful provider of store-and-forward communications software continues to be XcelleNet. The company provides a general-purpose platform for both mobile and remote workers.

Others are working to capitalize on XcelleNet's shortcomings — such as file synchronization at the file level only and limited support of wireless connections.

One contender is WorldLink from TDS/CompLink in Hoffman Estates, Ill. WorldLink provides single-session access to databases, Notes servers, legacy systems, mail servers and other platforms. It also includes many useful store-and-forward message processing features and is particularly strong at integrating disparate messaging servers on the back end.

Both RemoteWare and WorldLink will go head-to-head with the mobile middleware products.

Several vendors have recently been acquired by, or have established partnerships with large, influential vendors.

For example, Informix Software, Inc. said last fall that it will license MobileWare Corp.'s middleware as part of its strategy to extend database access to mobile workers. Middleware-maker Complex Architectures, Inc. was purchased by Sybase. And Motorola, Inc. in partnership with Nettech Systems, Inc. offers mobile middleware called AirMobile.

This activity is good news in that larger companies with pooled resources can afford to span more platforms. This increases their viability.

What to look for

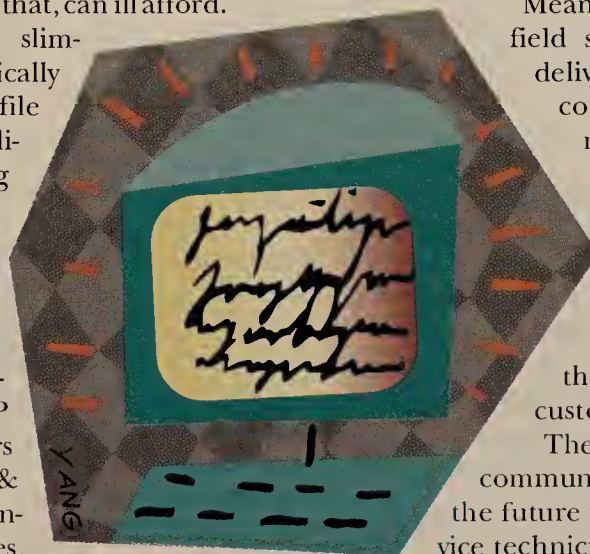
Andersen Consulting has experience using a variety of middleware tools. The consultancy's Anderson advises users shopping for mobile middleware to get a demonstration of that technology inter-operating with the platforms they will be using.

In addition, Anderson said, the key features that users should look for in mobile middleware are connections to many networks, modular features and vendor viability. Users who take his advice may find themselves well poised in five years, when wireless communications will become a competitive imperative within many industries.

Large enterprises still will be building their most strategic field applications internally with the help of experienced systems integrators. But the availability of mature middleware will reduce the mobile burden by leaps and bounds.

Scherberger is research director of mobile business strategies at Gartner Group, Inc., a consulting firm in Stamford, Conn.

MOBILE SOFTWARE



Wireless nets come of age

By Iain Gillott

Wireless data networks have existed for some time, though the market for them has developed at a glacial pace.

While there are still outstanding coverage, cost and reliability hurdles for carriers to clear, wireless data services have matured to the point where they finally are useful tools for solving many business problems.

"If you have a business need, you can generally be supported" by wireless data, said Steve Gurley, director of wireless data business development for the Personal Communications Division of integrator EDS Corp. in Waltham, Mass.

There is no foolproof formula for finding a carrier. The cellular network operators, ARDIS Co., RAM Mobile Data, Metricom, Inc. and others each have comparative strengths and weaknesses (see graphic). What service you buy depends largely on where your users are located, to what degree they roam locally and nationally, the bandwidth demands of their applications and any preferences for working with a large or small carrier.

ARDIS and RAM, whose networks carry data only, have been competing for about four years. Their Achilles' heel, as discussed elsewhere in this section, is their sluggish data rates of 4K to 8K bit/sec half-duplex.

But on the plus side, both of their nets have grown to where they cover the majority of businesses. And their prices have

finally fallen into the realm of the reasonable: RAM quotes an average user spending \$66 per month for sending 200K bytes (about 140 pages) of messages.

And last December, ARDIS announced new pricing packages for messaging services starting at \$19.95 per month for 20K bytes of data transmitted (NW, Dec. 18, 1995, page 10).

RAM is also planning interconnectivity to other competing networks. The firm plans to run gateways that allow cellular, paging and satellite

users to access its network, and vice versa, with what it dubs its Strategic Network initiative, in the middle of this year. The idea is to make it easier for more users to access services from more places.

"Generally, when a service provider improves access to their network, the market grows," said Mark Winther, vice president of worldwide telecommunications at research firm IDC/LINK in New York.

On the other hand, ARDIS already offers cellular, wire-line and satellite access to its net, which has not seemed to do much yet to boost the use of its net.

ARDIS' and RAM's biggest assets are undoubtedly the experience of their employees in providing wireless data solutions. As many companies have discovered, wireless applications and networks

are more complex and harder to maintain than their land-line counterparts. So experience is gold.

Down the road from ARDIS and RAM, the cellular situation has been a public relations nightmare. When, last year, Air-Touch Cellular disbanded its Wireless Data Group and then Ameritech Cellular Services said it was planning to resell RAM and ARDIS services, the outlook for cellular data — especially Cellular Digital Packet Data (CDPD) — seemed bleak.

Ameritech will probably start reselling ARDIS and RAM services during this quarter, but it turns out the company has not abandoned CDPD. Rather, like RAM with its Strategic Network initiative, Ameritech sees a need to expand its coverage with other networks and services.

This strategy could further confuse the customer, though. How do you explain to a large would-be user that for a "fully integrated" solution, it will potentially need three incompatible modems?

Competitors AT&T Wireless Services, Bell Atlantic NYNEX Mobile and GTE Mobilenet, Inc. are sticking to their CDPD knitting, though coverage is still not expanding as fast as anticipated — as of this month, 34 cities reportedly have CDPD fully deployed.

GTE, for its part, intends to launch its Circuit-Switched CDPD service midyear, which allows users to default to the analog network in CDPD dead zones but still retain their IP addresses and associated security. Competitors may follow suit, as Circuit-Switched CDPD was voted a standard last year by the CDPD Forum.

Don't look for help from Southwestern Bell Mobile Systems on this score. It views vanilla circuit-switched cellular services as the best option to offer right now because the infrastructure is mostly in place and potential users are likely to understand dial-up access better than packet services. The traditional user complaint here has been the cost and the relative unreliability compared with wired links.

Solving the cost issue is entirely up to the carriers. How badly do they want the business? Then they need to enhance their billing systems to support some creative rate plans. Many are in the throes of this now, with new rate plans expected later this year. Packages will likely be built around specific applications, such as wireless Internet access (NW, Jan. 8, page 24).

The reliability question was largely solved last fall when a rash of carriers in-

stalled modem banks in their nets that run error-checking protocols. Such protocols look ahead to circuit conditions and throttle traffic back when they are bad, rather than dropping the connection.

What about Metricom?

In the third quarter of 1995, Los Gatos, Calif.-based Metricom shot its fledgling, high-speed IP-based Ricochet network to the front of the line with a unique pricing structure that people could understand and afford. A monthly fee of \$29.95 includes all the usage you want, including Internet access. No per-minute, per-kilo-byte or service charges.

Modems are \$599 with no subscription, but are discounted down to \$299 with a one-year service commitment.

The hook for many users will undoubtedly be Ricochet's 14.4K and 28.8K bit/sec data rate, which should relieve much response-time frustration.

The main drawback to Metricom's solution is scarce coverage — today, it is confined mainly to Northern California and the Pacific Northwest. The company plans to implement the service regionally over the next few years.

According to Don Wood, Metricom's executive vice president of marketing for wireless services, this regional rollout approach "works for most people." Note that the company targets people who mainly work and live in the same community.

A good example of how Ricochet is being deployed is in Corvallis City, Ore. Last October, the city council in this town of 45,000 voted to let Metricom's Ricochet radios be installed on the city's streetlights. The decision followed the implementation of Ricochet on the campus at Oregon State University in Corvallis.

When the implementation is complete, service will be available throughout the community. For users in Corvallis, this means that the same network can be used at work, at the university and at home.

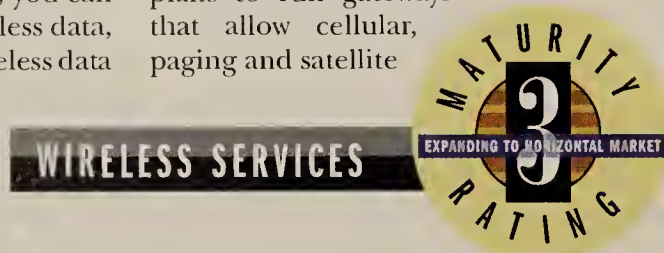
New two-way players

While the established providers will improve their accessibility, coverage and network quality, new players, such as paging company SkyTel Corp. and start-up Geotek Communications, Inc. will enter the two-way market.

SkyTel introduced its two-way paging service into the U.S. market last September for use with the Motorola, Inc. Tango pager.

The service pricing is attractive. Metro-

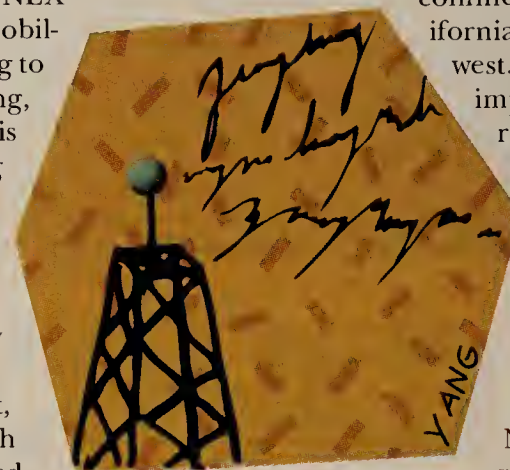
See Wireless nets, page 52



WIRELESS NET CHARACTERISTICS AND TRADE-OFFS

Network	Coverage	Pros	Cons
Analog cellular	Nationwide, nearly everywhere	Mature; modem banks upping reliability	Security is big concern; pay-by-minute a turn-off for small bursty transmissions
CDPD	Major metropolitan areas	Backed by standards forum; supports near-dial-up speeds; carries all advantages of IP	Many original supporters have withdrawn; limited geographic coverage; available from only one carrier in some markets
ARDIS DataTac	90%+ urban business population	Stable network; mobile data-savvy employees	Slow; no voice; no established telecommunications brand name; proprietary network protocol
Geotek GeoNet	Selected East Coast markets	Integrated voice and data net services, devices and software	Limited coverage; needs name recognition
Metricom Ricochet	Selected campuses and cities	High data rates; all-you-can-eat, affordable pricing	Limited coverage; single source of hardware; no national rollout plan
RAM Mobitex	90%+ urban business population	Stable network; mobile data-savvy employees; open net protocol means multiple modem vendors	Slow; no voice; no established telecommunications brand name
SkyTel Tango	Limited metropolitan areas	Attractive, predictable pricing	Message delivery latency means no good for time-critical apps

SOURCE: IDC/LINK



Tying it all together

By Dan Merriman

One of the thorniest aspects to implementing a mobile data system is gluing together all the components, including portable devices, servers, software and network services.

Just as the dread "some assembly required" message on a just-unwrapped Christmas toy has thwarted many a good intention, having to muster the technical savvy to put a mobile system together has more than once caused users to shelve projects. Would-be mobile users who cannot handle the projects in-house have not had a clear path for seeking help.

Recent software developments, though, go a long way toward addressing this hurdle. Mobile software vendors are taking on a significant portion of the integration and testing of the components up front, reducing the effort required by each customer.

Two choices

Today, you have two basic integration choices: Take a fully custom approach or use a customizable software platform that manages interactions between devices and networks.

A fully custom approach is only viable for the handful of companies that are aggressive innovators with large budgets. The custom integration process consists of an extensive and ongoing effort by skilled resources to properly configure, combine and test many complex hardware, software and service components for each release of the system.

But since a single customer funds all the development, integration and support with this approach, the overall cost of the custom project typically costs hundreds of thousands to millions of dollars.

For those with tighter budgets, customizable wireless applications and communications software are hitting the streets. Using these platforms spreads the development effort and common element costs across many users.

The platform approach allows users to shift their focus to planning, support and training and away from integration minutiae, explained Shirley Eis, president of Stamford, Conn.-based Software Corporation of America (SCA), a wireless data integrator.

The result is solutions that cost tens of thousands to hundreds of thousands of dollars—an order of magnitude less than

the custom approach.

Integration platforms come as customizable applications or communications software environments. Customizable applications are the appropriate choice if you need a new application and one is available on the market.

Between 60% and 80% of the customizable software is common across users. Currently available customizable applications include field service software from Service Systems

INTEGRATION OPTIONS



International, Ltd., Arrowsmith Technologies, Inc. and Ubiquenet, Inc.; a police information and a real estate application from SCA; field sales automation applications from Thinq Systems and DataSolutions, Inc.; transportation applications from Roadshow International, Synergistic Systems and Industrial Computer Systems, Inc.; and mobile health care applications from Summit Health Services, Inc., Health Data Sciences Corp. and Patient Care Technologies.

Communications software platforms are the appropriate starting point if you are trying to develop a new application or mobilize an existing one. Such platforms enable the user to handle wireless communications challenges without being a wireless technology aficionado, explained Michael Fabiaschi, vice president of sales and support at Racotek, Inc. in Minneapolis, a provider of wireless communications software.

Wireless' idiosyncrasies include long latencies, limited bandwidth, unreliable links and high usage charges.

Other companies that provide communications software platforms include Attachmate Corp., Digital Equipment Corp., IBM, MobileWare Corp., Motorola, Inc., Nettech Systems, Inc., Oracle Corp., SCA, Sybase, Inc., Wayfarer Communications, Inc. and XcelNet, Inc.

One company that has benefited from a communications software platform is Northern States Power Co. in Minneapolis. The utility uses wireless data to streamline the process of locating gas pipes and electric lines for customers, explained Helen Kulas, a project leader.

The company customized an application developed by Vertical Systems, Inc. of Eden Prairie, Minn., and used software

and integration services from Racotek. Kulas said implementing the system "would not have been possible if we were not able to build from an existing platform" because developing the necessary integration expertise would have required too much time and expense.

Seek help or go it alone?

Regardless of whether you are going with a custom or customized approach, you need to determine the extent to which you want to seek outside assistance. Taking on the full implementation should only be attempted if all the following conditions exist:

- You are an early adopter of leading-edge technologies.
- The skills required are a core competency of your company.
- You have, or can quickly acquire, the required resources—both financial and human.

Fabiaschi said many first-time users underestimate the difficulty of dealing with the nuances of radio frequency communications.

Sears Repair Services took the in-house approach when it began work on its wireless repair service application five years ago. The application now supports 1,000 field service workers, enabling Sears to improve its ability to quickly respond to customer service requests.

Larry Finney, senior systems director, said the integration component of the project was a challenge.

Sears got more involved than it would have liked in the design of hardware, software and communication protocols, he said, "instead of focusing strictly on the application and customer, as we would have preferred."

Who do you call?

If you are implementing the solution in-house, your main contacts today will be the vendors. Many are beginning to establish indirect channels, which will become more prevalent during the next two years.

For help with developing a custom application, you need to call in a systems integrator. Places to turn include EDS Corp., Andersen Consulting, IBM and KPMG.

These companies will provide technology expertise, while also being able to help with nontechnical issues such as project management, training and process reengineering. Expect to pay top dollar.

For most users, a combination of vendors will be required.

Vendors have recognized the need to proactively integrate their offerings and have formed alliances to provide complete solutions. For example, SCA teamed last fall with the Metro Listing Service, IBM, ARDIS Co. and Inacom Corp. to

offer a wireless Multiple Listing Service package to real estate agents in Atlanta.

Eis said that by doing the development, integration and testing up front, the alliance reduces users' cost and risk.

So what about those network managers who want to benefit from wireless data but are not aggressive with new technology and can only invest a few hundred dollars per user?

Before millions of boxes start disappearing off retail store shelves, both the supply and demand sides of wireless data for the masses need to converge.

A growing user reliance on applications such as messaging and groupware coupled with the need to be mobile will create an increased demand for untethered communications.

On the supply side, vendors must hit the price target of hundreds of dollars per user; to do so, integration will clearly have to be minimal, largely handled by the users themselves.

Bruce Walter, president of wireless messaging company RadioMail Corp., predicts major progress in 1996 with the cost challenge: "We will see wireless devices fall below \$500 with monthly network service costs as low as \$40," he said.

General-purpose use of wireless data by mobile professionals is expected to occur within two to four years.

Where to go from here

Determining the appropriate next steps depends very much on the aggressiveness with which you want to implement the technology, your budget and the availability of a current platform.

Early adopters with big budgets who want to use wireless as a strategic weapon are prime candidates for working with a systems integrator on a custom solution. The key question is whether you have the requisite budget to afford such an approach.

If, on the other hand, you see the value of wireless and want to mobilize an existing application, working with the communications software vendors would probably be the best approach.

For purchasing an application that already leverages wireless technology, you should contact the application providers to determine the best fit and verify the business justification.

If you want to benefit from wireless as part of a packaged solution, stay tuned. It will be important to monitor and evaluate the technology while keeping a close eye on your competitors. You don't want to be hung by your wires.

Merriman is a director at GIGA Information Group in Norwell, Mass. His research responsibilities include telecommunications solutions for remote and mobile workers.



Countdown

Continued from page 46

A few examples of innovative companies committed to mobile data's success:

Individual, Inc. in Burlington, Mass., is an information refinery.

Sierra Wireless, Inc. in Richmond, British Columbia, makes integrated CDPD, circuit-switched cellular and dial-up modems.

Data Critical Corp. in Redmond, Wash., develops systems and software for sending urgent data over existing wireless networks.

■ For remote access to enterprise networks, users should lean toward networks based on standard protocols such as IP. It is easier to develop new applications or modify old ones for use over IP-based services such as CDPD and Metricom's Ricochet service.

Circuit-switched cellular data also is a strong contender because it can be used with legacy dial-up applications.

■ For messaging, companies should look toward two-way paging services. As competition heats up, expect paging rates to decline, quickly matching today's one-way paging prices.

Unlike wireless electronic mail services offered over RAM and ARDIS, bona fide two-way paging will engender a constellation of inexpensive, low power-consuming, pocket-size devices, as well as two-way pagers integrated with cell phones, notebook computers and PDAs.

■ Finally, users who want to gain competitive and career advantages need to approach wireless data more creatively.

Organizations should evaluate new wireless data services by commissioning individual users. You'll know a service is ready when pilot users refuse to give back their radio modems at the conclusion of the test.

Make sure wireless data requirements are considered when selecting and purchasing portable computers. Battery performance, the number of PC Card slots and antenna placement are factors that could impact your ability to quickly adopt wireless data solutions later.

Don't be afraid to negotiate with service providers. Carriers that have poured millions into building their infrastructures are eager to win your business.

Constantly look for ways in which wireless data can enhance your business; your competitors are probably doing the same. There are now plenty of wireless data value-added resellers, systems integrators and consultants to help you craft a strategy and carry it to fruition.

And remember: Even industry insiders were skeptical about cellular telephones at first. Wireless data has just arrived. But make no mistake, it is here to stay.

Brodsky is president of DataComm Research Co., a Wilmette, Ill., consulting firm. His book Wireless: The Revolution in Personal Telecommunications is available from Artech House in Norwood, Mass.

Wireless nets

Continued from page 50

politan-area coverage is \$24.95 per month, with national service available for \$74.95.

While this may seem high compared with traditional one-way paging prices, IDC/LINK primary research has indicated that 50% of current paging users would expect to pay cellular-equivalent rates or more for this type of service.

Since the SkyTel 2-Way network guarantees delivery of a message, the fact that a user is out of range for a time does not mean that messages are lost—it just takes longer to get them.

The SkyTel network uses store-and-forward technology to pass a queued-up message along once the message recipient is back in range or turns his pager back on.

With one-way paging, users with a turned-off beeper simply miss the message.

Another option

Meanwhile, "bundle-provider" Geotek, of Montvale, N.J., announced commercial availability of its GeoNet digital cellular network and multifunction Enhanced Mobile Workstation in Philadelphia late last year. To complement the company's voice Specialized Mobile Radio net services, the workstation uses the GeoNet network to integrate mobile

phone, dispatch radio and messaging capabilities with a 5-inch, 100-character display.

Additional commercial Geotek services are expected in 1996 in Boston, Washington, D.C., Baltimore and Miami.

For the wireless data user, Geotek offers a set of applications specifically designed and packaged for vertical industries. The hardware is also designed for vehicle mount and can be ruggedized.

Industry outlook

These and other developments mean wireless data's complexion will get just a tad rosier in the next year. Most of the providers are not expecting accelerated adoption rates until late 1996 or early 1997.

And solutions will be better integrated with existing voice services. Expect cellular and PCS carriers to provide fully integrated solutions, using a single device for voice and data connectivity.

The dedicated wireless data providers such as RAM and ARDIS, however, will likely resell voice services, probably even issuing a separate bill.

Whose approach will win out? Or will there be room for everyone? Only time will tell.

Gillott is research manager of wireless communications in the Austin, Texas, office of IDC/LINK, a research company based in New York.

Where to go for mobile project help

The mobile and remote access companies mentioned in these pages can be reached at the following phone numbers:

MOBILE HARDWARE

Air Communications, Inc. — (408) 567-8000
Apple Computer, Inc. — (408) 996-1010
Ericsson GE Mobile Data, Inc. — (201) 265-6600
Harris Corp. — (805) 389-2350
Megahertz Corp. — (800) 527-8677
Motorola, Inc. — (800) 247-2346
Norand Corp. — (319) 369-3100
Sierra Wireless, Inc. — (604) 231-1100
Symbol Technologies, Inc. — (516) 244-4191
Sony Electronics, Inc. — (408) 432-1600
TELXON Corp. — (800) 800-8001

MOBILE APPLICATION SOFTWARE

Arrowsmith Technologies, Inc. — (512) 349-8920
DataSolutions, Inc. — (803) 787-3510
Health Data Sciences Corp. — (909) 888-3282
Industrial Computer Systems, Inc. — (303) 674-0700
Patient Care Technologies — (404) 235-7828
RadioMail Corp. — (415) 286-7800
Service Systems International, Ltd. — (913) 661-0190
Summit Health Services, Inc. — (800) 432-7788
Synergistic Systems — (904) 249-0201
TelePartner International — (800) 935-3270
Thinq Systems — (818) 752-1350
Ubiquenet, Inc. — (510) 820-1510
Vertical Systems, Inc. — (612) 943-1886
Wynd Communications, Inc. — (800) 549-6000

WIRELESS COMMUNICATIONS SOFTWARE AND MIDDLEWARE

Attachmate Corp. — (800) 426-6283
Data Critical Corp. — (206) 885-3500
Digital Equipment Corp. — (508) 493-5111
Frontier Technologies Corp. — (414) 241-4555
General Magic, Inc. — (408) 774-4000
IBM — (800) 426-2255
Informix Software, Inc. — (415) 926-6300
MobileWare Corp. — (214) 952-1200
Motorola, Inc. — (800) 894-7353
Nettech Systems, Inc. — (609) 683-0100
Oracle Corp. — (415) 506-7000
Racotek, Inc. — (612) 832-9800
Software Corporation of America — (203) 359-2773
Sybase, Inc. — (800) 879-2273
TDS/Comlink — (708) 781-1800
Trumpet Software International — 61-02-450220
Wayfarer Communications, Inc. — (415) 903-1720
WRQ — (800) 872-2829
XcelleNet, Inc. — (770) 804-8100

WIRELESS NETWORK SERVICES

AT&T Wireless Services — (206) 803-3500
Ameritech Cellular Services — (800)-662-4531
ARDIS Co. — (847) 913-1215
Bell Atlantic NYNEX Mobile — (800) 255-2355
BellSouth Cellular — (404) 249-5000
Geotek Communications, Inc. — (201) 930-9305
GTE Mobilnet — (770) 391-8000
Metricom, Inc. — (408) 399-8200
RAM Mobile Data — (908) 602-5500
SkyTel Corp. — (800) 643-0323
Southwestern Bell Mobile Systems — (800) 333-2355

MOBILE INTEGRATION SERVICES

Andersen Consulting — (312) 580-0033
EDS Corp. — (214) 605-6000
IBM — (800) 426-3333
KPMG — (610) 995-4485

REMOTE ACCESS HARDWARE AND SOFTWARE

3Com Corp. — (800) 638-3266; (408) 764-5000
Apple Computer, Inc. — (800) 776-2333; (408) 996-1010
Ascend Communications, Inc. — (800) 272-3634; (510) 769-6000
AT&T — (800) 242-6005; (908) 221-2000
Bay Networks, Inc. — (800) 776-6895; (408) 988-2400
Cisco Systems, Inc. — (800) 553-6387; (408) 526-4000
Combinet, Inc. — (800) 967-6651; (408) 522-9020
Digital Equipment Corp. — (800) 344-4825; (508) 493-5111
Hewlett-Packard Co. — (415) 857-1501
IBM — (800) 426-3333; (914) 765-1900
Microcom, Inc. — (800) 822-8224; (617) 551-1000
Microsoft Corp. — (800) 426-9400; (206) 882-8080
Novell, Inc. — (800) 453-1267; (801) 429-7000
Primary Access Corp. — (619) 675-4100
Primary Rate, Inc. — (800) 950-ISDN; (603) 898-1800
Rockwell Network Systems — (800) 262-8023; (805) 968-4262
Shiva Corp. — (800) 458-3550; (617) 270-8300
Telebit Corp. — (800) 989-8888; (508) 441-2181
U.S. Robotics, Inc. — (708) 982-5001
Xircom, Inc. — (800) 438-9472; (818) 878-7600
Xylogics, Inc. — (800) 225-3317; (617) 272-8140



Remote access can't slow down

By Hank Allard

As the wireless data world struggles on, the wire-line dial-up remote access market continues to flourish. This is because remote LAN access products and services are fulfilling many mobile and satellite office workers' connectivity needs at a reasonable cost and without the speed limitations of low-bandwidth wireless nets.

With remote users demanding access to all network resources, strategies and implementation plans for both LAN and Internet access are becoming a corporate necessity.

In fact, many organizations are seeing the wisdom of combining these access capabilities into one secure, cost-effective network.

The move to connect dispersed users is reflected in the remote access market's success. International Data Corp. in Framingham, Mass., for example, estimates 1995 revenue from remote access servers to be \$600 million — a growth rate from 1994 of 91% in units sold and 74% in dollar revenue (see graphic).

Another measure is the large number of mergers and acquisitions, such as Cisco Systems, Inc.'s acquisition of Newport Systems Solutions, Inc. and Cominet, Inc. and Bay Networks, Inc.'s acquisition of Xylogics, Inc.

Four years ago, the market was driven by small organizations or departments wanting to provide LAN access for their mobile sales and service workers. Today, firms are also trying to address major downsizing, outsourcing and reengineering

initiatives. Putting workers in their homes or in satellite offices where real estate is inexpensive, for example, is seen as a savvy way to save on office space while making workers more productive.

Product decisions

Determining which remote LAN access products and services to acquire can be broken into five key decision areas that have to do with

REMOTE LAN ACCESS



where processing is performed, which access lines and services to use, what equipment to install at central and satellite locations, and what to do about security and management.

1. Where to perform the processing. The crux of this decision comes down to remote control vs. remote node data transfer schemes. Remote control software allows a remote PC user to emulate a LAN-attached PC over a dial-up link. The screen information on the central LAN-attached PC is transferred to the remote PC, but all computer processing occurs on the local PC.

Remote control connections are used mostly by mobile users who have their own workstation on the central-site LAN. Remote control is poor at supporting graphical user interfaces (GUI) such as Apple Computer, Inc.'s Macintosh or Microsoft Corp.'s Windows. This is because of the large amount of screen update data that must be sent across the relatively slow dial-up link.

To provide GUI support, remote node technology was born.

With remote node technology, a remote access server front-ends the LAN at the main office. It controls the dial-up link, performs compression and handles protocol support. A remote PC equipped with remote node client software and a modem dials up and behaves as though locally attached when, in fact, all workstation processing is happening remotely.

Remote node products are offered by companies such as Shiva Corp., Xylogics/Bay, Telebit Corp., Novell, Inc. and Attachmate Corp.

To fully support a remote user, a combination of remote node and remote con-

trol functions is necessary. And, fortunately, the major players today offer remote access servers that combine remote node/control and include management and security software.

The remote access server will also provide an integrated or externally accessible modem pool connection.

2. Which access lines to use. Today, the fastest industry-standard modem available is V.34, which supports a maximum 28.8K bit/sec over the analog telephone network. A user must live within this modem limitation or go digital.

Corporations today need to support a rapidly increasing number of dial-in users as well as address new remote access applications that can require 10 times the current performance provided by V.34 modems. These applications include high-performance World-Wide Web access (64K to 128K bit/sec), image and database access (128K bit/sec and higher), and videoconferencing (128K to 384K bit/sec).

Moving traffic from local access areas to corporate backbones or to the Internet also poses challenges, such as exponential growth in users and access lines. In addition, corporations must support multiple protocols as well as unique management, security and billing strategies.

Specialized remote LAN access network services from the likes of AT&T, CompuServe, Inc. and MCI Communications Corp. bundle some of these functions in.

3. What to run at the central site. The most important test for a corporate remote access server is its ability to meet a range of very specific corporate network design objectives. These design criteria include support of applicable protocols, ease of use, cost and security.

IP is becoming the protocol of choice, as is reflected at the U.S. Postal Service's Raleigh, N.C., facility. The postal service uses Telebit Corp.'s NB40i and Netblazer remote access routers as part of its effort to consolidate IBM SNA remote traffic onto a TCP/IP network.

Rick Yost, manager of network software for the Raleigh Postal Service, said that in the future, his organization plans to have an all-TCP/IP domain with provision for remote access use by both workers and customers. Yost said he is looking to the Internet to provide this pervasive networking capability.

4. Home-office equipment. The selection of equipment for in-home offices is dependent on the central-site remote access server choice, as well as access-line availability and cost. Corporations must be prepared to assist their home-office workers in equipment selection, installation and support.

Where high-performance ISDN lines are required, corporations should be prepared to negotiate with local telephone companies on behalf of the employees.

And there are equipment differences to consider. ISDN terminal adapters are generally easy to install but will not provide all the bandwidth ISDN can deliver

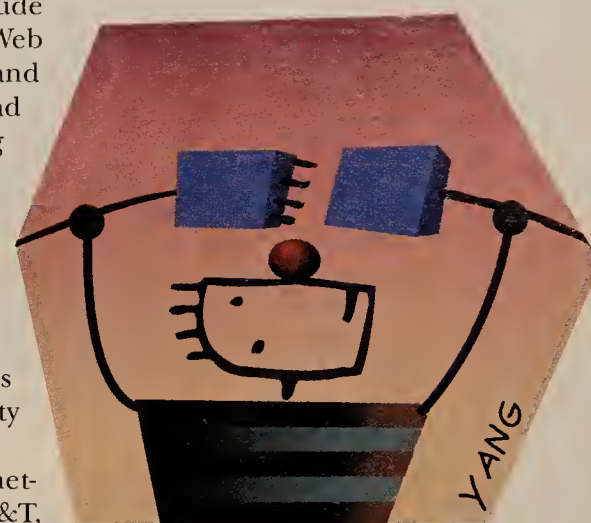
because of the 115K bit/sec speed limit of serial-line PC interfaces.

Ethernet ISDN access nodes require a home-office network and require technical support during installation. PC bus adapters may require additional software but are the least expensive approach.

Card bus (PCMCIA) versions often combine a V.34 modem with an ISDN link for access at home and from the road.

5. Security and management. The initial focus on security and management by corporations was to put those functions in a single remote access server at the central site. Now, the Internet-approved PPP has become the client remote access method of choice.

PPP includes Password Authentication Protocol (PAP) and Challenge Hand-



shake Authentication Protocol (CHAP) security. CHAP is generally preferred over PAP because the password is never sent over the wire.

Take charge!

Corporations should get more proactive about developing an integrated remote LAN-Internet access plan. At a minimum, a corporate plan should include support for plain old telephone service (POTS) and ISDN devices, as well as central-site ISDN access equipment.

Most corporations favor the POTS model for dial-up access today. This model assumes the ability to install a connection in less than a month, a very low installation cost of less than \$100, a fixed monthly base charge of less than \$50, and the ability to monitor monthly usage and access-line charges. A decision to expand or curtail services can be made on a monthly basis as the number of users and their bandwidth needs grow.

Finally, more emphasis should be placed on firewalls that combine intelligent routing with a range of security capabilities. To that end, a look to public network service providers for remote access services that bundle in many of these functions for a fixed monthly fee might be in order.

Allard is a principal in Acton, Mass.-based Edge Media, a consulting firm that focuses on remote access and mobile computing products and services. Allard's *Strategies and Solutions for High-Performance Remote Computing seminar* is now offered through Network World.

ALIVE AND WELL

The remote access market's steady growth reflects the growing dispersion of corporate workers.



SOURCE: IDC, FRAMINGHAM, MASS.

You show me yours, I'll show you mine

By Joanie Wexler

Paper-thin vendor commitments and the tendency of humans to gradually warm to new technologies: In the mobile data market, that combination spells stalemate.

Unlike the successful remote access market, much of the mobile industry is caught in a frustrating "you show me yours, I'll show you mine" catch-22: The vendors want to see lots of green before

they'll stick by a product line, but users want the commitment before they'll cough up the dough.

Something's got to give. If Motorola head Chris Galvin's experience in the technology sector means anything, that something — like it or not — will probably be time.

Motorola knows a little about the

human factor in technology. Chris and his father, who ran the company before him, have often commented that it takes at least 10 years after a new technology is invented before the general population will begin using it.

Trouble is, most vendors have quick-return business plans that don't account for the human lag factor. A new pen-based tablet no one has ever conceived of using sits around for a year and doesn't make millions; it's history. Then, when users are ready to step up to the purchasing plate, the product — and, more important, the vendor's credibility — is gone.

I hear tell that there are actually a few organizations out there — biggies — salivating to deploy thousands of mobile devices to their sales forces. The consultants helping them are in a bind: They can finger the right device for the company but are scared to recommend the vendor. Or they can pick a more solid vendor, but then the device is wrong or too expensive.

Even the simplest solutions don't match today's drive-thru mindset for immediate gratification, and users need time to adjust. I'm still building up my tolerance for worrying about where the overnight cell phone charger is, overcooking the cellular battery, footing the \$25 bill for a new one, discovering that my Envoy personal communicator is not rechargeable if you don't actually use it, and so on.

And the services have just got to get better than this. As I have recently traveled through the greater Newark, N.J., area, do you think my Envoy would work? Nah. It's got an ARDIS connection, and that be RAM territory, folks!

So I picked up my cellular phone instead. Do you think that would work? Nah. "Your carrier does not have a roaming agreement" with the local carrier, the operator sniffed.

Gee, if the tried-and-true AMPS network still has roaming agreements to work out, where does that leave CDPD, which is barely running in isolated regions?

But is there really anything all that unusual going on? For how many years did we have the Year of the LAN? ISDN? ATM? Wireless won't be any different.

Perhaps it's up to the deep-pocketed vendors with diverse product lines, like Motorola, to break the stalemate. They have the resources to subsidize their mobile developments from product lines that are more mature while users get accustomed to this new way of communicating. Maybe Sun or HP, with their fingers in a million pies, will buy Apple's Newton division so it won't die.

One way or another, the vendors who expect to win have to stand by their commitments. Or the beginning of most users' 10-year warm-up curve will keep getting postponed and the Year of Wireless will catapult into the next century. ■



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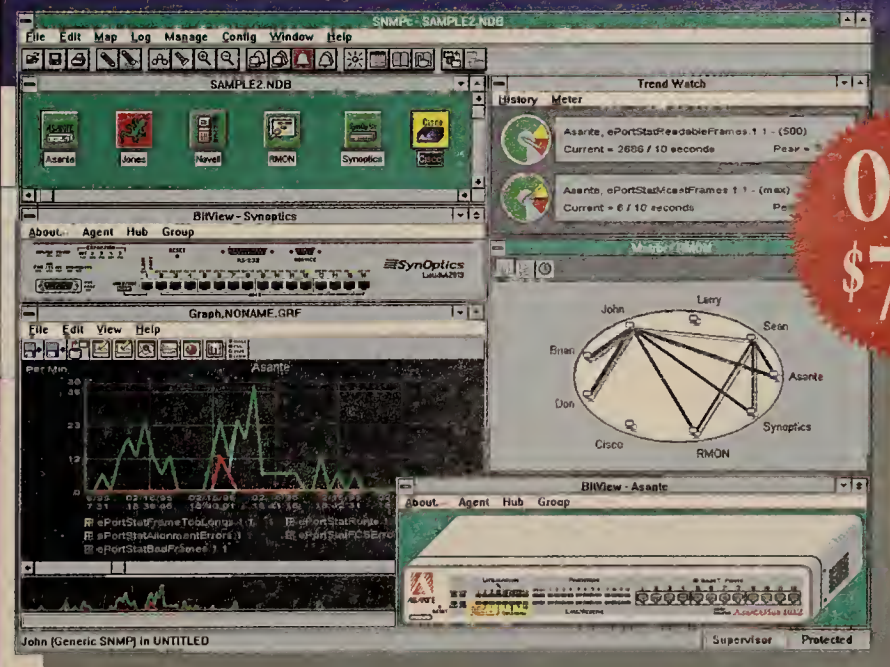
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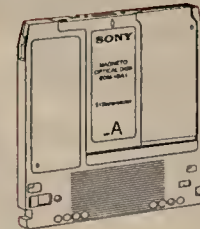
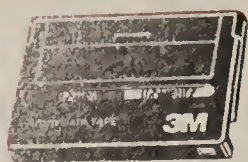
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4mm Cleaning Cartridge - 2 pack	22.92	21.46	20.74
Maxell			
4mm HS/120 DDS 2	19.94	18.76	18.10
4mm HS/90	9.29	8.69	8.39
4mm HS/60	7.42	6.94	6.69
4mm Cleaning Cartridge	9.81	9.19	8.88
SONY			
4mm DG-120MA DDS 2	24.58	22.94	22.24
4mm DG-90MA	10.17	9.49	9.19
4mm DG-60MA	7.24	6.78	6.55
4mm Cleaning Cartridge	10.93	10.24	9.89
TDK			
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8mm Data Cartridges

	Quantity 1-9	10-49	50+
3M			
8mm 112M	\$ 7.87	7.37	7.12 ea.
Exabyte			
8mm-160M - For XL Drives	15.15	14.19	13.69
8mm-112M	10.49	9.83	9.49
8mm-54M	10.04	9.39	9.08
12 Pass Cleaning Cartridge	18.37	17.19	16.62
Maxell			
8mm HS-8/160M - For XL Drives	14.16	13.26	12.79
8mm HS-8/112M	7.23	6.77	6.54
SONY			
8mm QG-160MA - For XL Drives	14.68	13.74	13.28
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8mm QG-54MA	8.69	8.14	7.86
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DC-2120 QIC-80 Preformatted	13.19	12.36	11.94
DC-2120XL QIC80 Preformatted	15.84	14.84	14.34
DC-6150	13.08	12.24	11.83
DC-6250	16.89	15.82	15.28
DC-6525	22.34	20.92	20.21
Magnus 1.2GB	34.69	32.49	31.39
Magnus 2.5GB	48.64	45.54	43.94
Travan TR-1 400/800MB	26.93	25.22	24.37
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DC-2120 QIC-80 Preformatted	12.54	11.74	11.34
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5.25" 650MB 1024 B/S Poly	71.94	67.37	64.94
5.25" 1.2GB 512 B/S Poly	81.94	76.94	74.34
5.25" 1.3GB 1024 B/S Poly	81.94	76.94	74.34
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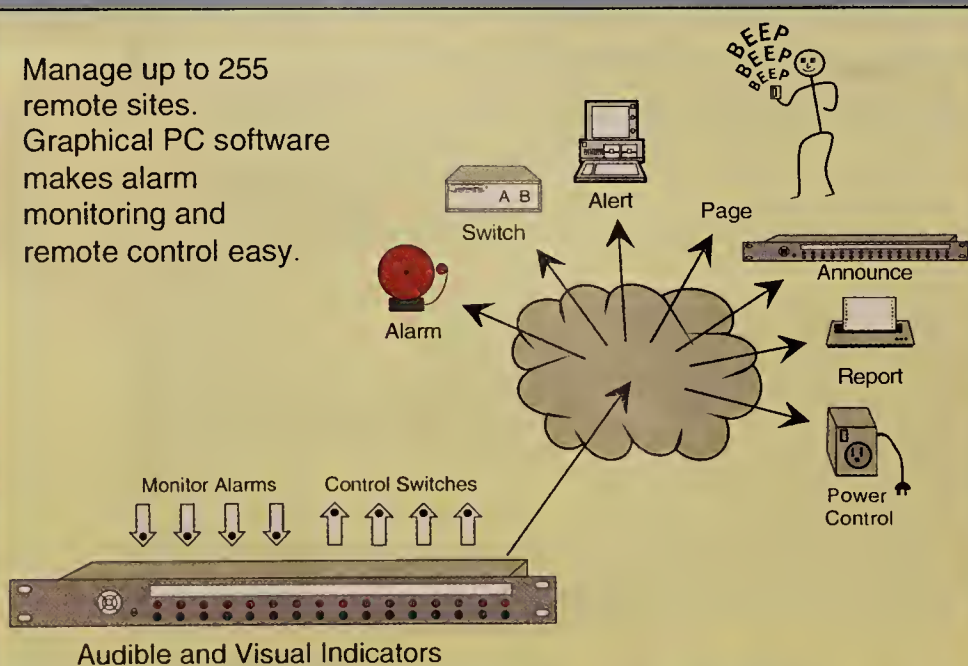
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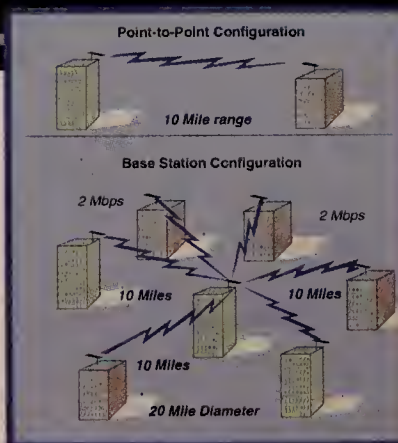
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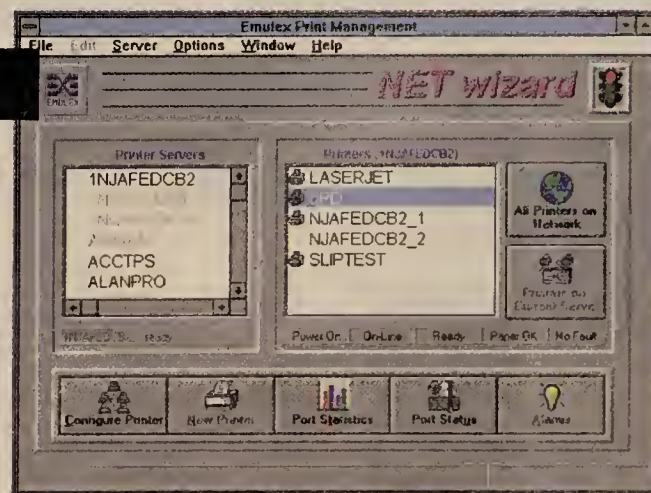
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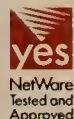


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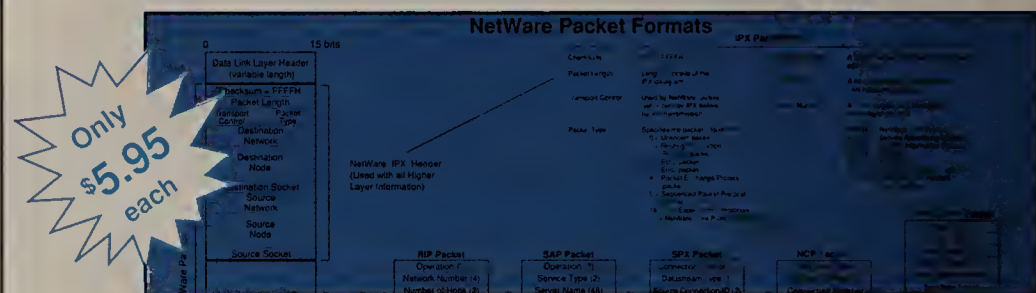
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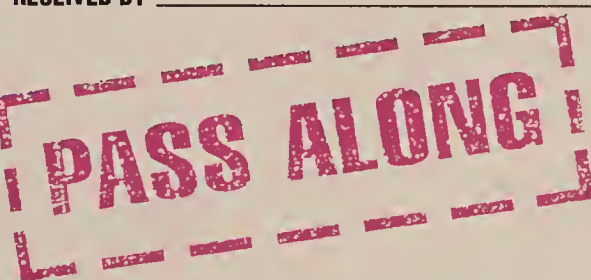
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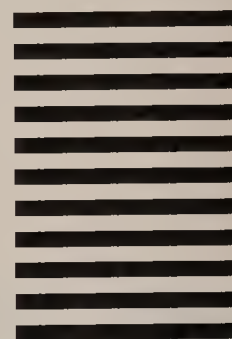
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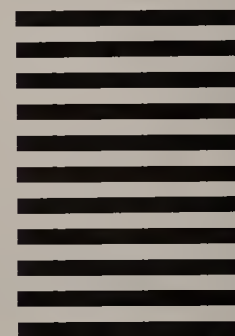


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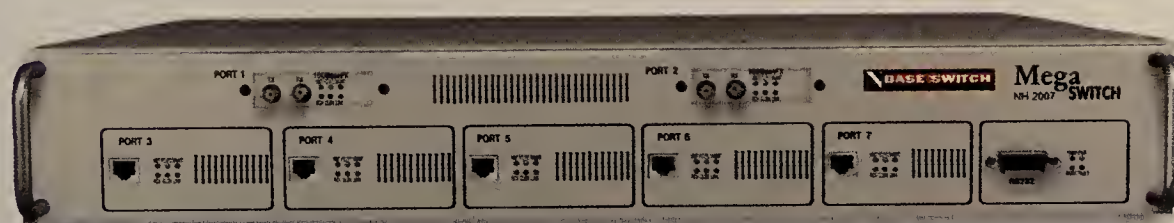
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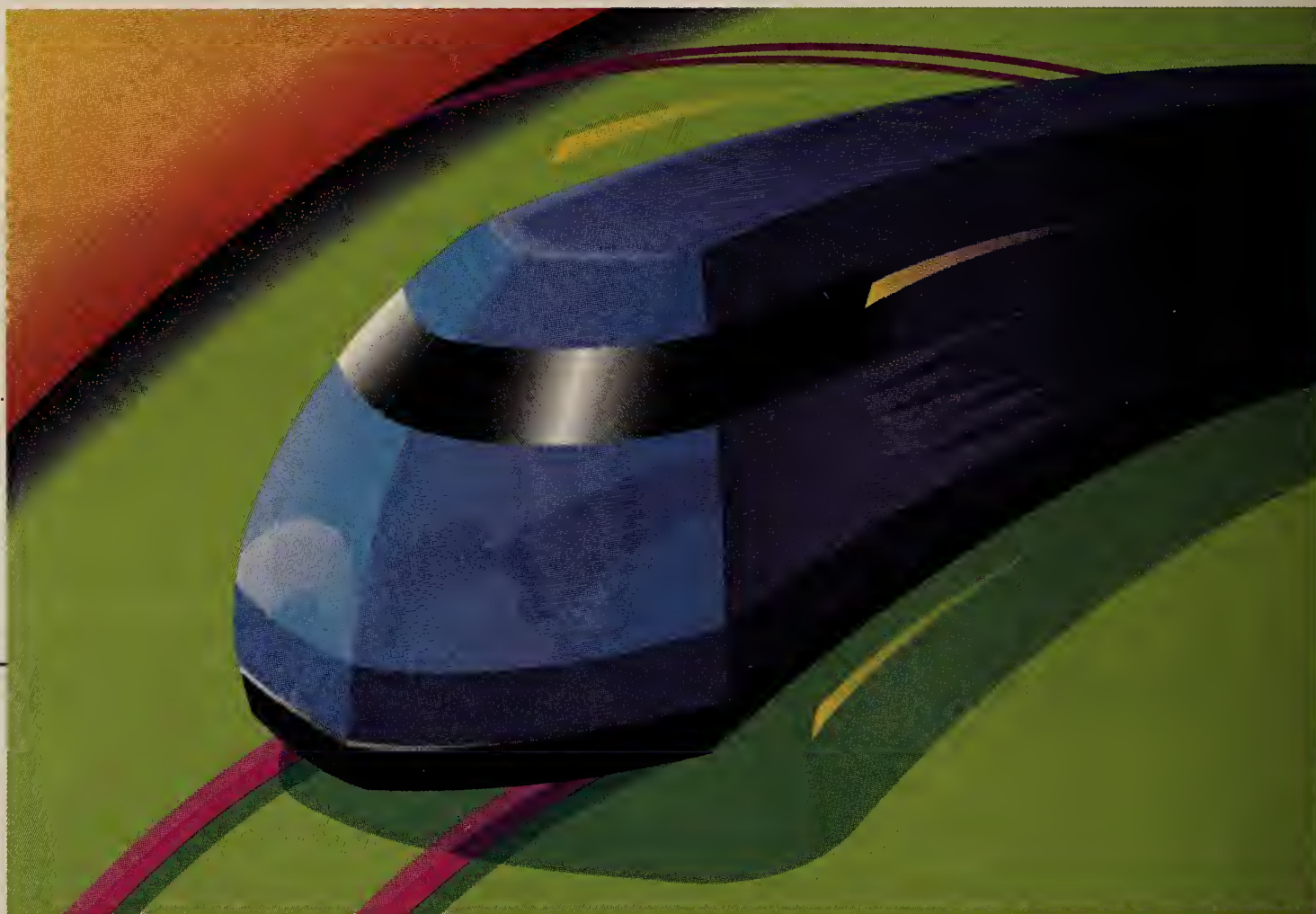
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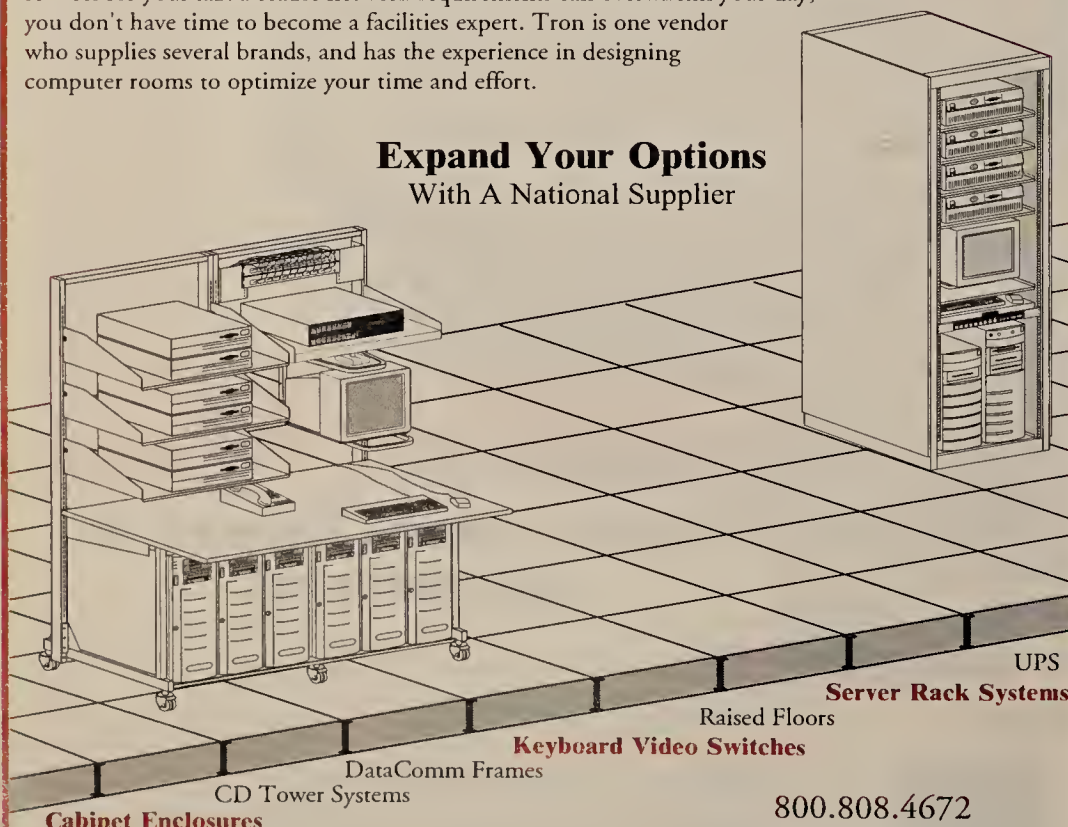
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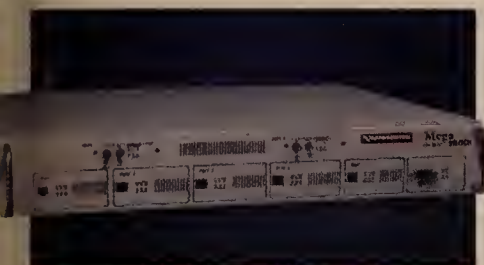
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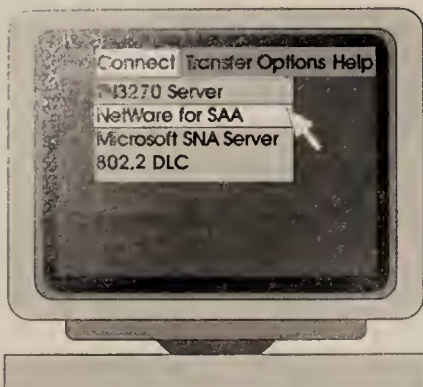
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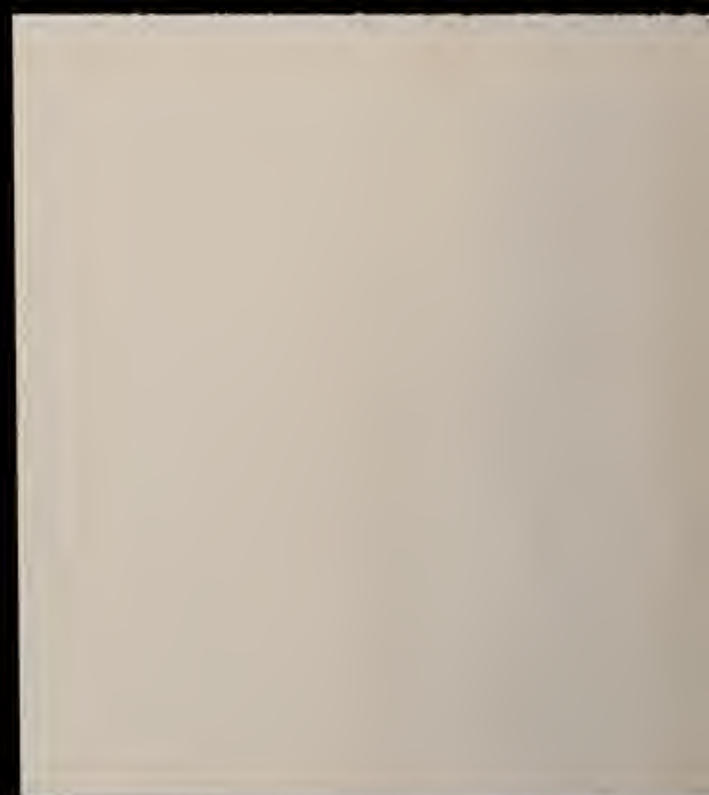
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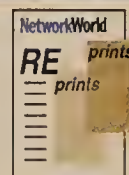
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Cisco, HP way behind on VG-AnyLAN products

By Jim Duffy
Palo Alto, Calif.

Cisco Systems, Inc. and Hewlett-Packard Co. last week said they will deliver jointly developed 100VG-AnyLAN products at least a year later than originally planned due to changes in those plans.

The companies said the first 100M bit/sec 100VG-AnyLAN router interfaces from the alliance now will appear on Cisco's 7500 router instead of the 7000 and 4500 devices as initially stated (NW, Sept. 12, 1994, page

4). The VG interfaces, as well as a Cisco IOS-based routing blade for HP's hubs, will now ship mid-year or later instead of mid-1995 as initially stated.

"There's a number of things that would account for some of the delays," said Brice Clark, director of strategic planning for HP's Roseville, Calif., division. "One would be adjustments in our own strategy and the second would be adjustments in the roll-out of the Cisco product line."

HP and Cisco view the 7500, which started shipping last fall,

as the optimal platform for the VG interfaces because it lends itself to "high-performance, multimedia-capable networks," Clark said. "We can integrate many more VG networks at line speed within the 7500 platform."

The VG interfaces will be implemented on modules based on Cisco's Versatile Interface Processors (VIP), making them compatible with either the 7000 or the 7500, said Richard Palmer, Cisco's director of marketing for high-end routing.

Cisco recently announced a program under which customers can trade in Model 7000 modules for VIP modules (NW, Feb. 12, page 17).

Cisco still plans to add VG interfaces to its 4500 routers, but

not until later this year or next year.

Cisco officials said a lack of market pull contributed to the product delivery delays.

"The marketplace has taken some time to look at how 100M bit/sec solutions fit in with network architectures vs. other technologies, like ATM," said Peter Clarke, Cisco's director of business development.

"The market for high-speed

22, page 1).

However, Cisco has had enough confidence in demand for high-speed Ethernet to ship fast Ethernet modules for the 7500.

Cisco and HP would have come out with their VG products on time and Cisco may not have acquired Grand Junction Networks, Inc. if Cisco really had faith in the VG market, said Skip MacAskill, senior analyst for

What a difference two years makes

1994 What they said was...	1996 What they meant was...
VG interfaces for the Cisco 7000 and 4500 routers by mid-1995	VG interfaces for the Cisco 7500 router by mid-1996
Routing module for HP's AdvanceStack hub by mid-1995	Routing module for HP's AdvanceStack by fall 1996
Development of a common, open architected internetworking software platform for interoperability	Support for Cisco IOS
"This is a significant step in the history of internetworking." — Gary McAnally, general manager of HP's Roseville, Calif., division	"The market...has not been as quick to emerge as we initially thought." — Peter Clarke, Cisco's director of business development

Ethernet has been not as quick to emerge as we initially thought," he said.

That may be true for VG. Even VG pioneer HP recently imploded its VG-only strategy by announcing plans to ship 100Base-T products (NW, Jan.

Gartner Group, Inc.'s Network Computing Infrastructure group. "The VG market is just not there, so being late is something they can get away with," he said.

©Cisco: (408) 526-4000; HP (800) 752-0900.

Start-up NetPhonic readies software for phone-to-Web link

By Network World staff
Mountain View, Calif.

A start-up company next month will introduce a product that makes the World-Wide Web just a phone call away.

NetPhonic Communications, Inc.'s Web-On-Call Voice Browser software is based on text-to-speech and audio recording technology that will enable people to phone into a Web site and have requested information automatically read back to them.

The software also will enable Web access via electronic mail and fax machines.

"Until now, a Web server could only be accessed by a computer with an Internet connection and Web browser software. Our new product makes Web content available to anyone, with

or without a computer," said Ken Rhie, president of NetPhonic.

The software could be used, for example, to let real estate brokers in the field dial in to a Web site and get the latest information on available homes.

Corporate human resources departments also could use the software as a way to make information more readily available to employees.

NetPhonic's software runs on a Web server and must be used in conjunction with a voice modem for each phone line that has access to the server.

It can be used to provide access to internal or external Web sites. The software supports user identification and password protection.

The software should help

Web software providers in their fight to keep pace with proprietary groupware vendors. Groupware providers, such as Lotus Development Corp., have already teamed with other companies to provide groupware-telephony links.

Web-On-Call Voice Browser will be available about midyear for an introductory price of \$1,000 per phone line. Special pricing is available for nonprofit organizations.

©NetPhonic: (415) 962-1111.

Microsoft on track with Exchange

By Carol Sliwa
Redmond, Wash.

Customers banking on the first-quarter release of Microsoft Corp.'s long-delayed Exchange Server will not be made April fools this year, according to the company's group product manager.

Greg Lobdell, who has managed Microsoft's Exchange project for the past 14 months, said it is 95% likely that the electronic messaging product will debut on schedule by the end of March.

Release Candidate 2 (RC2) boxes arrived in early adopters' hands last week. Other than bug fixes and performance tuning, the only new element is the Exchange client's ability to recognize World-Wide Web URLs in messages, Lobdell said. With one click on the hotlink, a user can gain access to a Website.

"There was a huge debate internally about: Is [Release Candidate 1] good enough?" Lobdell said. "But we think there's just a couple things that we [had] to fix."

Sources said plans call for Microsoft Chairman and Chief

Executive Officer Bill Gates to tote out Exchange boxes in Las Vegas on April 2 when he delivers the keynote address at NetWorld+Interop '96.

For some anxious customers, the rollout won't come a moment too soon.

"I think if they don't make this quarter, there's going to be tremendous pressure to reopen the question" of choosing a companywide solution, said Tom Webb, manager of electronic messaging for Shell Services Co., the information technology arm of Houston-based Shell Oil Co.

Webb said he had been told that the product would be released to manufacturing in mid-February, and instead, another release candidate arrived. He said he would have been happy to roll out RC2 if it were the final version.

For those who are not already onboard, Microsoft's marketing message for Exchange may be

lacking focus, particularly in view of the release of its Internet Information Server, some observers said.

"The Internet Information Server and Microsoft Exchange are, in a way, butting heads in the market," said Dwight Davis, editor of the "Window Watcher" newsletter in Redmond, Wash. IS managers have waited years for Exchange, "then suddenly there's this new platform that's arrived on the scene with some people making promises that

can do a lot of what Exchange would do for them at a lot lower price," he said.

Tom Austin, a research director with market research firm Gartner Group, Inc. in Stamford, Conn., said the explosion of the Internet caught Microsoft off-guard. Now Microsoft "playing catch-up" around using Exchange server as part of the company's Internet strategy. "Exchange can deliver information — but not applications — the Internet," he said. ■



Microsoft's Greg Lobdell manages the Exchange project.

Telecom

Continued from page 12

contract with GTE Corp. Pending authority to offer in-region long distance, Ameritech will combine its own network with LDDS capacity to offer not only inbound and outbound long-distance calling with calling cards, but also DS0, DS1 and DS3 private lines, switched digital service, videoconferencing and primary rate ISDN.

■ Hundt soft-pedaled his earlier concerns that the FCC is at least \$10 million short of adequate funding to meet the crushing workload and multiple deadlines imposed on it by the new law. The FCC's congressional liaison will work "in a non-public

way" to try to gain more funding for the agency, Hundt said. But he also pleaded with industry lobbyists not to bury the agency in paperwork during the critical next few months. "We don't want to meet the deadlines," Hundt said. "We want to beat them."

■ In a report to Congress mandated by a 1993 law, the FCC said it expects a price war in the mobile services industry.

Although licenses for new digital wireless systems known as personal communications services are still being auctioned and the systems are being built, the anticipation of the new competition is already pushing carriers to drop their prices, the report said. ■

IBM

Continued from page 1

The server group, headed by Nicholas Donofrio, IBM's senior vice president, was formed last year to present a united front for the company's disparate server offerings.

While the Internet is certainly center stage these days, analysts and customers questioned just where IBM is going.

"You've got to get the basement in place before you paint the house," said Vince Pepe, a distributed systems analyst for Washington Mutual Bank in Seattle. "There is a new market out there and everybody wants a chunk of it, but... it's going way too fast. Maybe you make a business by [getting product out] and picking up the pieces later. I don't know."

"Where is the innovation?" asked Robin Layland, principal

with Layland Consulting in West Hartford, Conn. "IBM is not clear where it wants to go with these products. They're in 'me, too' mode compared to a company like Sun, which is coming out with innovative Internet products."

Leading off

A centerpiece of the announcements will be an integrated Internet Bonus Pack for IBM's OS/390 MVS mainframe software. The Bonus Pack will include Internet Server for MVS, Internet firewall support and a series of home-page templates that customers can use to quickly build a Web presence.

"We look at OS/390 as a growth platform and we want to go after new markets with it — Internet access is just one of them," said Joe Kirschner, manager of OS/390 software sales.



IBM's Donofrio heads up the server group.

OS/390 integrates over 30 products, such as VTAM and TCP/IP, into one system that promises to save users 19% to 29% in software fees (NW, Oct. 9, 1995, page 84). Release I with Internet support will be available March 31.

Customers are eager to employ Big Iron as Internet hosts, and more than 50% of mainframes already have TCP/IP support, Kirschner said.

Users, however, expressed some concerns.

"I am very shaky about letting our production MVS mainframes be Web servers because I am not convinced security would be airtight," said a network executive who asked not to be named.

At the mid-range, IBM will

integrate its Internet server software into the AS/400's operating system, OS/400. It will support a number of Web browsers, including Netscape Communications Corp.'s Navigator. The firm will provide a gateway that lets users access the AS/400's database, DB2/400, via the 'Net.

At the workstation server level, IBM will unveil Java support for its AIX operating system, allowing users to build and run Java-based applications on the RS/6000 workstation. That feature will be available in May. Gateways that let AIX users link with IBM's CICS and DB2 applications on the mainframe are also on tap.

IBM will also offer a multimedia server package that lets graphic-intensive data be delivered on a LAN using Network File System over the Internet. That package will be available in March starting at \$9,000.

Other Internet-related products include a new version of PC SystemView, formerly known as NetFinity, that lets administrators manage remote systems over the Internet via a Web browser.

"If this is IBM's network-centric vision, they need to polish their glasses still," said Anura Guruge, an independent analyst based in New Ipswich, N.H. ■

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Cisco

Continued from page 1

Though there are Simple Network Management Protocol MIBs for ATM networks — Interim Local Management Interface (ILMI) and the AToM MIB — they provide limited management capability.

ILMI, for example, is only used for autoconfiguration — mapping ATM addresses to virtual circuits.

The AToM MIB allows network managers to collect statis-

tics on the number of ATM cells transmitted, received, received in error and dropped due to congestion.

The specification will identify different methods for collecting traffic information, including the use of circuit steering to direct selected ATM virtual connections to remote analyzers and probes.

The circuit-steering method is being defined by another multivendor group called the ATM

Bank

Continued from page 1

headed for Bank South's migration. "The underlying infrastructures were totally different, and it's impossible to support everybody's new stuff. It's quicker and cheaper to give everybody the same equipment."

Many IS shops have a lone department with some non-standard system inherited in a corporate acquisition. If it's isolated, sometimes it is easier to leave the island alone; sometimes, as NationsBank decided, it's better to rip out a young system. The decision was especially dramatic since both banks were implementing overhauls in the same time frame.

NationsBank's Model Banking initiative sought to improve customer service by having standard software and equipment across sites, said IS representatives coordinating the effort.

The firm installed IBM's OS/2 LAN Server 3.0 with Communications Manager at its branches, linking them over leased lines to data center mainframes in Richardson, Texas, and Richmond, Va. More than 100,000 desktops will run OS/2 with custom front-end modifications as well as a vertical market package called Bank Pro from Argo Data Resources Corp. in Dallas.

When NationsBank drew up its plans several years ago, its staff decided OS/2 was the only

robust, truly multithreading operating system available and the logical choice. Also, the company had a longtime relationship with IBM and its services.

"OS/2 has always been strong in banking because IBM is strong in banking at the mainframe level," said Rob Enderle, an analyst with market research firm GIGA Information Group, Inc. in San Jose, Calif.

"OS/2 has always been strong in banking because IBM is strong in banking at the mainframe level,"
Rob Enderle said.

Bank South launched its initiative in November 1994, getting all new hardware from AT&T GIS, which also provided some consulting services.

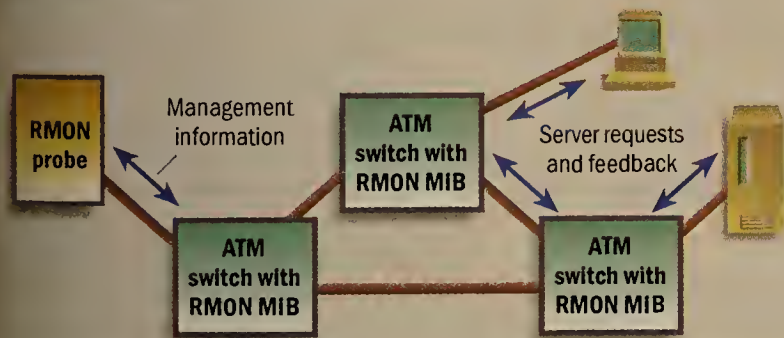
The company chose Windows NT partly because it was the platform for a desired banking application. But over the past year, the staff became impressed with its robustness and capabilities, Schulman said.

He said he recognizes that NationsBank's decision is an appropriate tactical choice but finds it ironic that his staff judged Windows NT technically superior to OS/2, which became its replacement.

Now Bank South's leased PCs are going back to AT&T GIS. The old IBM 4700s moved back into the branches and are awaiting new software from NationsBank. And Bank South's tellers — those who still have jobs — are losing their mice. As typical with bank mergers, about half the branch office workers are being laid off as NationsBank closes redundant branches, most of them in the Atlanta area. ■

LOOK WHO'S TALKING

Cisco's ATM RMON spec could help network managers determine which clients and servers are eating up the most ATM bandwidth.



tics on the number of ATM cells transmitted, received, received in error and dropped due to congestion.

The ATM RMON specification would make it possible to pinpoint the amount of traffic being generated by host computers and monitor conversations between pairs of nodes.

This could help administrators determine whether bottlenecks exist and where they might be or find "top talkers" on the network.

"An RMON structure will

Monitoring (AMON) group, which formed last year (NW, June 12, 1995, page 6). Four of the vendors working with Cisco — Axon, Frontier, Net2Net and Network General — also are in the AMON group.

The vendors plan to submit the specification to the IETF next month and to the ATM Forum later this year. They hope it will enable the development of applications for remote monitoring of all aspects of ATM network operation, according to sources. ■

The Gibbs guide to the care and feeding of network managers

I just got back from a trip to London, where I was chairing a Web development conference, and it really took me back to when I used to live there. Most particularly, when I first started working with computers.

In those far-off days of the bit biz, some (mumble, mumble) years ago, PCs and networks were not just novel—in the terms we think of them today, they were, well, unthinkable. Ah, those were the days. The golden days when no one referred to people in the computer industry with that derisive term “geek.” We were nerds and proud of it.

In those days, men were real men, women were real women and guys who managed mainframes were *real* guys who managed mainframes.

Now mainframes are rare, PCs and networks are near ubiquitous, and mainframe computer managers are a dying breed.

Worse still, most jobs in the computer industry have become commoditized. Technical expertise is no longer worshipped as it once was.

This leads to a very important problem and the central thesis of this column: Does your company know how to take care of you?

Do they know how to provide the basic care and maintenance required to keep you, the network manager, happy?

To address this, the Gibbs Think Tank and Sumo Wrestling Tag Team has developed instructions that network managers should hang around their neck when they enter their new place of employment for the first time:

“The Care and Feeding of Your New Network Manager.

“Congratulations on the acquisition of your new Network Manager. This guide will help you get the best performance from your Network Manager and ensure a long and cost-efficient lifetime (at least three years).

“Operating environment: Your Network Manager should be situated in a warm, dry place for maximum performance. If such a location cannot be found, any old location will do as long as you keep telling your Network Manager that a new office will be found just as soon as accounts/shipping/wombat dispos-

Most jobs in the computer industry have become commoditized. Technical expertise is no longer worshipped as it once was.

al's new quarters are finished. Do not commit to dates; ignorance is bliss.

“Lighting: Your Network Manager will operate in the full range of office lighting, but in natural daylight, his eyes will water and blink excessively. Do not be alarmed; this is quite normal. Your Network Manager's eyes adapt to artificial lighting only, but if he is required to go between buildings frequently, cheap sunglasses may be used.

“Feeding: High-sugar foods should be supplied to your Network Manager for early morning starts. We recommend Pop-Tarts, danish and anything else that can be eaten while typing. Coffee should be supplied on a 24-hour basis.

“Affection: Your Network Manager doesn't need any. He doesn't have time.

“Reference materials: Provide your Network Manager with all controlled-circulation magazines and free publications. The acquisition of all other material needed should be left to the ingenuity of your Network Manager. If your company has a newsgroup access limitation policy, ensure that your Network Manager is not blocked from alt.sex.bondage. He doesn't understand it, but he will feel shamed if his peers can discuss threads he has no idea about.

“Disposal: When your Network Manager has worn out and can no longer be repaired or upgraded, he can be disposed of in any way you wish since he's biodegradable. Just ensure you remove all manuals, floppy disks and pocket protectors from your Network Manager's pockets before disposal.”

Is there life out there? Let Gibbs know at mgibbs@gibbs.com or call (800) 622-1108, Ext. 504.



Mark Gibbs

Of chess and telecom reform: All the right moves

Six hours and 72 moves into the second game, world chess champion Garry Kasparov gazed at the 256-headed monster and said, “I accept your resignation.”

Kasparov's opponent was Deep Blue, a massively parallel supercomputer built by IBM. Man and machine battled through six matches last week at a tournament sponsored by the Association for Computing Machinery.

The event made history because few expected Kasparov to win the game.

Deep Blue was built to slay chess opponents. Its 256 processors calculate 50 billion to 100 billion moves every three minutes.

Its database includes games played by chess grandmasters during the past 100 years, along with billions of end-game scenarios.

Deep Blue is to mortal chess players what Robocop was to crooks.

Yet Kasparov somehow managed to win this game. The grandmaster said his victory came partly from the computer's inability to assess psychology. “I faced an opponent that has no emotions.”

Telecom service providers will need to scrutinize the logic that governs their business operations.

Mentioning psychology in the logical world of chess might seem odd. After all, chess entails mastering the use of material (the various pieces), positioning, tempo in the race to control the board and ensuring the king's safety. Cold logic would seem to hold sway in this realm.

Kasparov noted, however, that logic did not always help Deep Blue react to illogical game moves. The “gambit” is one example. A gambit is a move, or series of moves, where the player deliberately risks losing one or more pieces to gain a better position. Kasparov's subtle strategy was often too much for the Spock-like reactions of Deep Blue.

Non-chess loving network managers may wonder how this story applies to them. (I first learned of the tournament while watching a newscast on “Saturday

Night Live.” The closing wrap was, “People don't give a crap about chess.” If that's true, I'd better get straight to the point!)

Kasparov's lesson has big implications for network managers who have to put up with anachronistic logic from vendors struggling to compete in the wake of telecommunications reform.

In the confusion, vendors are going to fall back on traditional thought patterns as they create new services and vie for new business. Such retreats

will get them into trouble and make customers mad.

One example is how some Baby Bells are backpeddling on ISDN. I wrote last month how Pacific Bell petitioned the California Public Utilities Commission to cap free evening and weekend use, plus double

the usage fee. My theory was that Pac-Bell miscalculated demand from home users and was looking to soak everyone for its mistake. But several readers wrote and said I missed the real issue.

PacBell is worried, they said, that people will sign up for ISDN and drop their old analog phone lines. After all, ISDN was designed to carry data *and* voice. The carrier is afraid that people might actually use the technology as intended.

USWEST, which last week reported a 6% drop in net income, wants to triple ISDN rates in its 14-state region from \$60 to \$180 a month for unlimited use. Unfettered monopolies apparently still think like monopolies.

Service providers will need to scrutinize the logic that governs their business operations. Garry

Kasparov-like users and upstart competitors will be challenging the old logic at every turn. Vendors that stick with old thinking will simply lose business.

Some long-distance companies are starting to get it.

Last week, the unthinkable happened when AT&T and MCI revealed discussions of possibly joining forces to build local infrastructures to compete against Baby Bells.

There will be lots of telecom gambits bandied in years to come. Vendors who adjust to their nuances will win; those that don't—well, I think the word winners will say is “checkmate.”

Buerger is a networking industry consultant and writer in Atlanta. He can be reached at dave@buerger.com.



Dave Buerger

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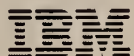
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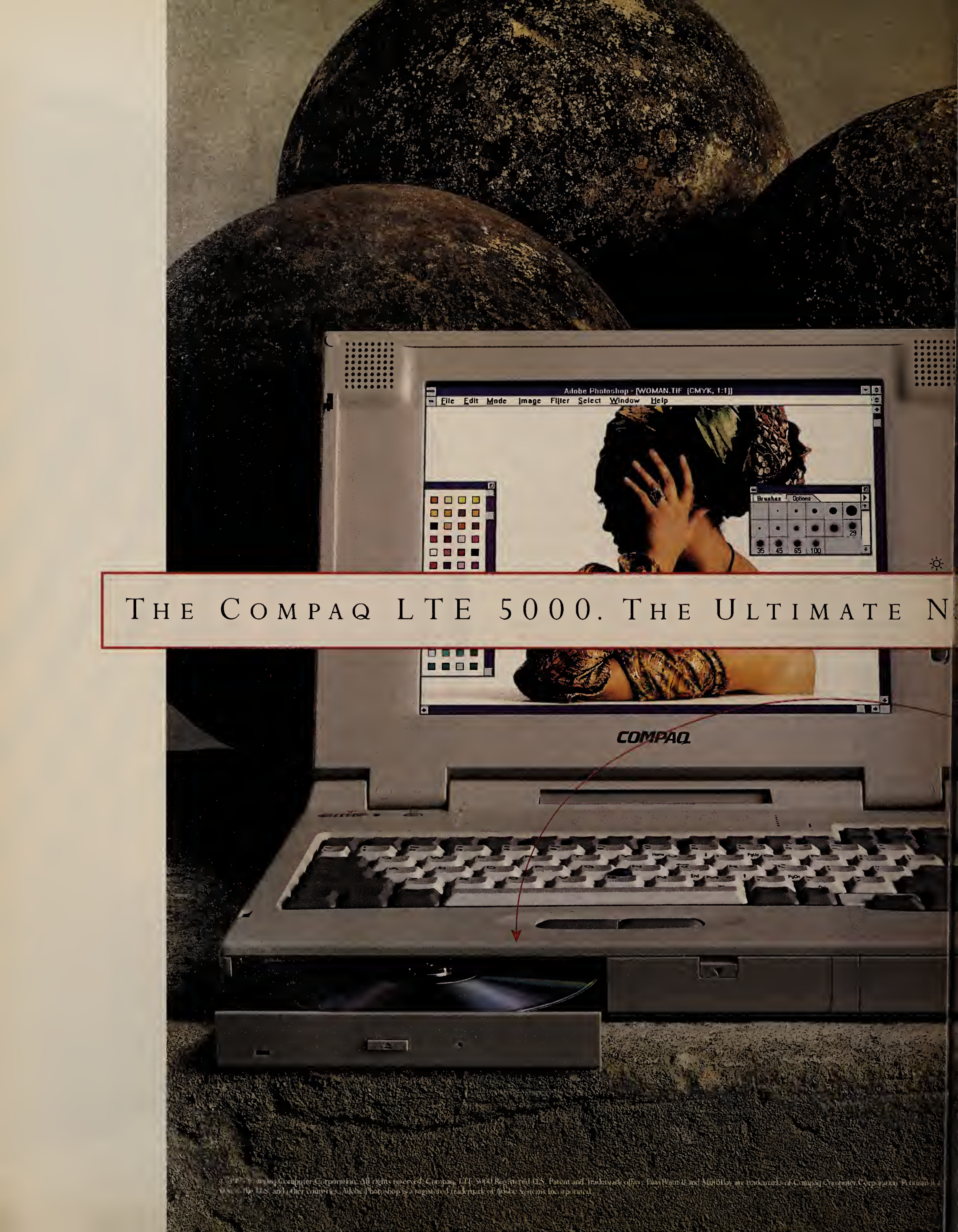
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